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# Electrical Contracting

With Which Is Consolidated  
The Electragist and Electrical Record

*"Fire Stop"  
now used*

*Wire  
in A.B.C.  
Armored Cable*

NONE GENUINE WITHOUT  
THE WORD "SAFECOTE"



OR  
TRADE  
MARK

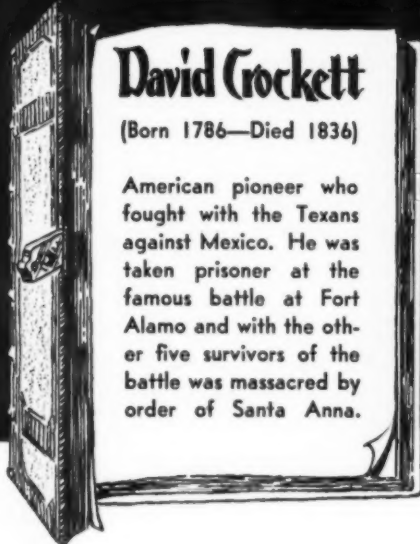
LABEL OR TAG ON EACH COIL



National Electric Products Corporation  
Pittsburgh, Pa.

*Better Wire-  
Better Cable*

# names



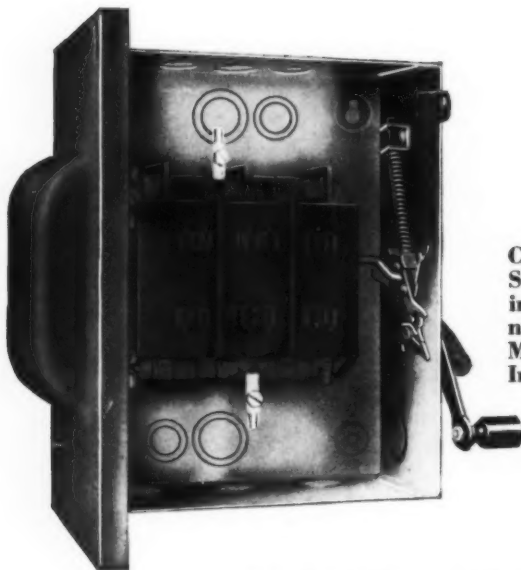
## David Crockett

(Born 1786—Died 1836)

American pioneer who fought with the Texans against Mexico. He was taken prisoner at the famous battle at Fort Alamo and with the other five survivors of the battle was massacred by order of Santa Anna.

# that have made history

## COLT NOARK SWITCHES



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VOLUME 33  
NUMBER 10

# electrical contracting

WITH WHICH IS CONSOLIDATED ELECTRICAL RECORD  
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RCA VICTOR  
LESSONS IN  
PICKING UP  
PROFITS  
No. 6



## A reminder from RCA VICTOR *... get business where the money is!*

Headlines in the daily papers tell the story about P.W. A. money going to the nation's schools... money for re-equipping, building, renovating. Every indication shows that here is a real market for RCA Victor Sound Systems... a market with money totaling many millions. And you should get your rightful share.

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are following. With the enormous influx of cash into the school field, the market for RCA Victor Sound Systems is due for even greater volume. The progressive contractor knows this and is wisely establishing himself as the headquarters for sound systems in his community.

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# Differentials

HOW much is a contractor entitled to for his services in selling the products of a manufacturer? For many months there has been an agitation on the part of individuals and organized groups of contractors for a 20 percent differential. Is this proper?

IN considering the differential for the contractor it is necessary to take into consideration many factors which are ordinarily not thought of when the subject is discussed. In the first place, there are some three thousand or more electrical manufacturers. Not all of these manufacturers sell through the wholesaler or the contractor. Many of them sell direct to the ultimate user. These direct selling manufacturers compete with manufacturers who sell through the contractor. Can a manufacturer give a contractor a 20 percent differential over an industrial plant and still compete with a direct selling manufacturer?

Are the contractors themselves going to be satisfied with a flat 20 percent? Does such a policy adequately compensate for service rendered? Is the contractor who does no selling, no market development, entitled to the same degree of compensation as the man that maintains an adequate force to perform such services? Is the contractor who buys only a few thousand dollars worth of electrical equipment in the course of a year entitled to receive the same degree of compensation as the contractor who buys many times as much?

*Electrical Contracting, August, 1934*

There are a thousand or more electrical wholesalers, most of whom sell direct to industrials and commercial buildings to some degree. Can these wholesalers be kept in line with a flat 20 percent differential to the contractor? Will not such a flat differential be a tempting bait to offer industrial customers?

If a 20 percent differential is proper for industrial reflectors, is it also proper for conduit fittings or motors or time-switches? In other words, can a flat differential be used regardless of the material or equipment?

A NUMBER of manufacturers are trying to solve this problem because they realize that there is a certain group of electrical contractors that are capable of producing a handsome volume of business at a cost below what the manufacturer is now paying to get similar business. Because it has been impossible to compensate these contractors adequately without giving a similar compensation to all other contractors those constructive contractors have been handicapped.

There is every reason to believe that the manufacturers and the wholesalers are not only sympathetic but anxious to find a way of compensating the contractor who is a business producer. While the way has not yet been found, considerable progress is being made. One thing is certain, however, the answer obviously cannot be a flat percent off regardless, be it 20, 30 or any other figure.



## THIS HOUSE IS HAUNTED!

There's many a good house that's haunted — haunted by wiring installations that would give any self-respecting contractor the creeps. Over-loaded circuits. Double and triple sockets. Fearful home-made connections. ¶ The interesting thing about these haunted houses is that there are so many. You'll find them right in your own neighborhood. Every such house is a prospect for a profitable rewiring job — to the electrical contractor who will do some constructive *selling*. ¶ Question—how to start? It's not hard to get permission to "look around" at wiring in customers' homes. When you've spotted a "haunted" house, arouse the owner's interest in the comforts and conveniences he can have with better electrical work. "Build up" your sale. ¶ Graybar has prepared an interesting booklet to help you with your selling job. It is written from the viewpoint of your prospective customer—describes home *check-up* suggestions in detail. Ask us about it. Write—or mail the coupon below.

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"HAUNTED HOUSES"  
—THIS BOOKLET CAN  
HELP YOU FIND IT!**

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IN USING  
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Find Your Social Standing  
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Gentlemen: Please send me full information about  
your booklet, "Haywire." EC8-34

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VOLUME 33  
NUMBER 10

# electrical contracting

WITH WHICH IS CONSOLIDATED ELECTRICAL RECORD

AUGUST  
1934



## When Magic Fails

an easy out; if your charms are never-failing, as I've often heard you say, they'll bring you life and liberty by finding out that way."

The poor Magician pitched right in, he labored hard and long, waving charms and chanting prayers, but every one was wrong. He mixed his strongest potions in a bunch of bowls and jars, then starved himself to skin and bone, to squeeze between the bars. He even faked a hanging, and twitched as one who died, hoping the guards would take the bait and carry him outside. But when they turned their backs and laughed, they heard him sadly say: "Go tell the King to have a heart—I cannot find the way." Then Alexander came and said: "I hope this gag of mine will make you use your noodle when you're stuck another time. I'll tell you the solution and you'll be plenty shocked, you could have walked out any time—the cell door is unlocked!"

About 3000 years ago there was lots of competition for the fat and influential job of Royal Head Magician. This bird could make the rain come down by cooking up a spell, he told the Royal Family what stocks to buy or sell; he cured the Queenly stomach-ache with horsehair from the stable and tipped the King when danger lurked from poison on his table. No self-respecting monarch would venture forth to battle without the Seer's prediction, gleaned from smoking hearts of cattle.

King Alexander loved his Court Magician, so they say, but also liked to razz him in his Royal rowdy way. One day, with nothing else to do, smart Alex figured hard, then arranged a little frame-up with the Captain of the Guard; they grabbed the Court Magician, with his charms and books as well, conveyed him to the dungeon and heaved him in a cell. "Now, Magi," growled the King, "the walls are thick, the bars are stout, but from your cell, I swear to you, there is

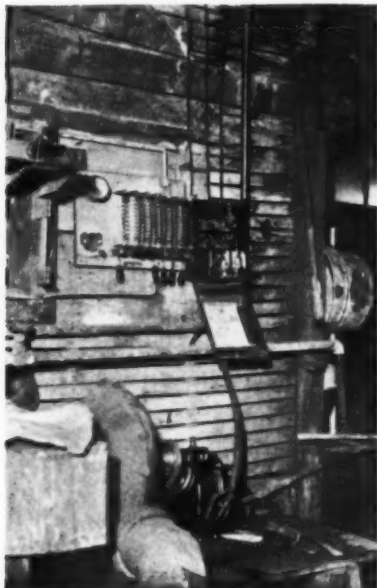
Contractors, we've been in the red for many a weary year, all hoping for some miracle to put us in the clear. We're stale from heavy thinking, our fists are full of scars from digging at the cruel walls and beating on the bars. But now we know recovery can't be brought by magic spells; that only going out for work will free us

from our cells. So let's put on our fighting clothes, cut out the weeps and wails, walk out into the open and expose ourselves to sales. The rules are changed, the game's more fair, the way is plain to see; the Code's our door, the knob is oiled, just turn it and be free.

by  
John  
Wise



# 7 Common Types of Electrical Defects



Plating shop in group of wooden structures, adjoining tenement house.

Upper:—Hazardous motor installation—Open wiring, motor not grounded, open switch, open resistors, etc.  
Violations:—2-d, g; 3-c, d, e; 4-a, d; 5-a; 7-a.

Lower:—Another fine example of motor wiring in same plant. No. 14 tapped to No. 6, open relays, no conduit bushings, open wires draped to a nearby small motor, ungrounded.  
Violations:—1-d; 2-d, e, f, g; 3-c, d, e; 5-a; 7-a, b, c.

The electrical inspector is expected to give the owner and electrical contractor an explicit survey of violations existent upon a customer's premises. To cite each detail often becomes a laborious task. We have therefore summarized for our readers the typical violations which occur, and recommend this arrangement for consideration in the field. By noting the comments which accompany the various photographs taken for this article, this Violation Key readily demonstrates its usefulness.

These pictures, taken in Kansas City, Mo., are typical of conditions in many other communities which can be corrected only through reinspection.

## 1. Protective Devices

- a. Over-fused
- b. Bridged
- c. Pennies
- d. Over-calibrated
- e. Tied in

## 2. Conductors

- a. Cords wrongly used
- b. Unapproved types
- c. Circuit over-loaded
- d. Open wiring prohibited
- e. Taps with smaller wires unprotected
- f. Improper splices
- g. Insulation lacking
- h. Unsited to temperature

## 3. Devices

- a. Heating from contacts
- b. Insufficient capacity
- c. Near combustible materials
- d. Exposed live parts
- e. Improperly mounted
- f. Worn out

## 4. Boxes and fittings

- a. Omitted
- b. Inadequate size
- c. Need replacement
- d. Close unused openings
- e. Covers omitted
- f. Not suited to condition
- g. Improperly supported

## 5. Grounding

- a. Omitted
- b. Deteriorated
- c. Needs repair
- d. Exposed to injury

## 6. Fixtures

- a. Improperly supported
- b. Re-wire
- c. Defective sockets

## 7. Wiring method

- a. Unapproved method
- b. Mechanically incomplete
- c. Additional supports needed



Large fruit and vegetable store. Rear view of wiring for large full-front sign board.

Violations:—1-a, c; 2-c, d, f, g; 3-a, b, c, d, e; 4-a; 7-a.

*Electrical Contracting, August, 1934*





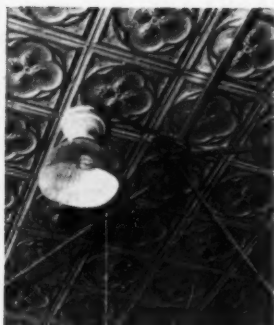
Large direct-by-mail advertising shop. Plenty of loose paper rubbish around at all times to start a lively blaze upon slightest trouble.

Left:—Combination gas-electric outlet, with canopy dropped to make way for a 4-way cord layout. Cords supported from metal ceiling with bare iron wires, on pipes, etc.

Violations:—2-a, c, d, e, f, g; 7-a.

Right:—Another old gas-electric outlet re-vamped. This time some metal moulding is introduced, but method of supporting it was not known; neither was it bushed at outlet.

Violations:—2-a, d, f, g; 4-a, d; 5-a; 6-a; 7-b, c.



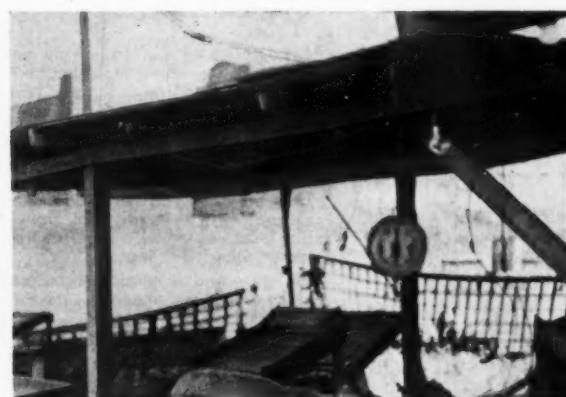
"Handy Man" twisted cord wiring in large rooming house. Cords tapped to old knob and tube wiring in basement for convenience outlets on first floor.

Violations:—2-a, c, f, g; 4-a; 7-a.



"Wildcat" gas tube sign installation in delicatessen in a congested shop area. Transformer placed on ledge of wooden transom bar, high tension leads draped about iron bolts which support transom. No permit issued, inspector just happened to drop in.

Violations:—2-a; c, g, h; 3-e, d, e; 7-a.



Large fruit store annex wiring, note swinging switch loop, controlling festoon circuit.

Violations:—1-a; 2-c, f, g; 3-a, b, c, e; 4-a; 7-a.



Twenty-two room hotel in crowded tenement area, originally wired for one iron outlet, but considerably "inflated" since.

Left—Bathroom ceiling, with lamp cord branches in three directions. Bare taps, nail supports, etc., etc.

Violations:—1-c; 2-a, c, d, f, g; 3-e; 4-a; 6-a, b, c; 7-a.

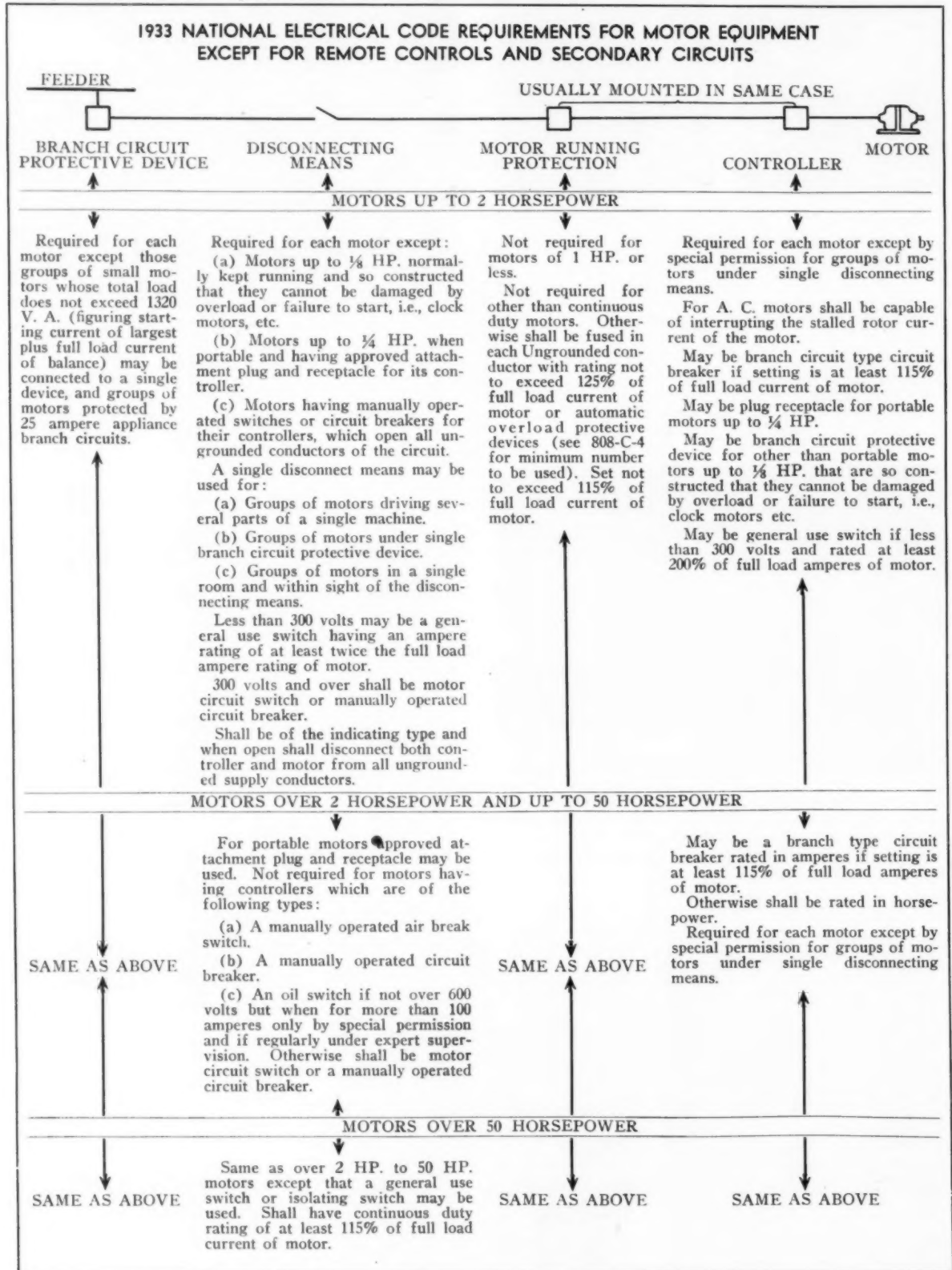


Right—Corner of hallway, which displays the acme of cord wiring technique.

Violations:—Oh, what's the use—No. 1 to 7 inclusive.

# CHART FOR MOTOR CONTROLLERS AND DISCONNECTING SWITCHES

Because of the number of questions asked about the Code rules for motor controllers and disconnecting switches, H. L. Parks of the West Virginia Inspection Bureau has prepared a chart of the different rules governing such equipment, which has been found to be very handy as a ready reference. This chart is reproduced below.



# Code Rulings and Explanations

Issued by Electrical Contractors' Code Authority

## Skilled Worker Ratio

Chapter VI, Article II, Sec. 3

This provision governing skilled worker ratio applies to employment on any electrical construction or installation work and not upon the total employment of an electrical contracting establishment. It provides that not more than one person not employed as a skilled electrical worker shall be employed to every one, two or three skilled electrical workers on any electrical construction or installation work.

Thus, there may be one helper to the first one, two or three skilled electrical workers on any job; two helpers to four, five or six skilled electrical workers on any job; three helpers to seven, eight or nine skilled electrical workers on any job, etc. The term electrical construction or installation work does not refer to common labor operations or non-electrical work.

## Employer Compliance with Hours

Chapter VI, Art. II, Sec. 8

The question is asked whether there is anything in the Code that would prevent the small contractor who works with the tools during the day from working as long as he desires individually, at night on estimating, soliciting work or bookkeeping.

*Answer:*—There is no limitation as to the hours that a contractor, who is limited to 40 hours per week in working with the tools himself may spend on estimating, bookkeeping, soliciting work or managing his business beyond the 40 hours of manual labor. At the conclusion of his work with the tools the contractor resumes the status of an employer.

## Towns of Less Than 2500 Population

Chapter I, Art. III, Sec. 2-B, Par. 3(b)

This provision refers only to the exemption of the employees from the 40 hour maximum week provisions of Section 2-B, Article III, Chapter I of the Code, when employed in

establishments employing not more than two persons in towns of less than 2500 population, which towns are not part of a larger trade area.

This exemption does not exempt employers as electrical contractor owners of such establishments from any other provisions of the Code.

The exemption of establishments in the so-called "local service trades" in towns of less than 2500 population does not apply to any groups of the construction industry, as these are not classed as service industries. A "service trade" includes such establishments as barber shops, pressing establishments, etc., entirely local in character and which are not affected by competitors from other territories, such as the competition faced in the electrical contracting industry by bidders and competitors from other towns and outside areas.

## Definitions

Chapter VI, Art. I, Sec. 1

The question is asked whether a fixture dealer who submits a bid for the sale and installation of fixtures must file copy of his bid with the electrical contractors' bid depository in his area.

*Answer:* (a) If the bid is a blanket bid including both the fixtures and the installation of same, the bid is an electrical construction project and is subject to the provisions of the Electrical Contractors' Code.

(b) If the specifications call for separate bids covering the furnishing of the fixtures as one item and the installing of the fixtures as another item, only the installation bids are subject to the provisions of the Electrical Contractors' Code.

(c) The determination as to whether the fixtures and the installation shall be included as a blanket bid depends upon the form of the specifications and the call sent out to the bidders. The Code requires that the awarding authority shall prescribe terms of competition which shall insure parity of standing to all bidders. (Sec. 4, Art. VII, Chapter I.)

## Owner Compliance

Chapter VI, Art. IV, Sec. 8

A bonafide owner, who is not so functioning that he becomes a member of the construction industry as defined in Section 1, Article II, Chapter I of the Code, is not bound by the provisions of the Code. The Code does not have jurisdiction over the public at large. Responsibility can only be placed upon the contractor in restricting him from bidding to an owner who will not agree to comply with the regulations of the Code.

## Uniformity of Information

Chapter I, Art. VII, Sec. 4

Inquiry has been received relative to bidding on a job where the original sub-contractor was removed from the work before the job was completed and the bonding company was required to complete the job. In calling for new bids representatives of the bonding company furnished bidders with the original complete plans and specifications and gave each bidder full opportunity to inspect the completed portions of the work on the job in order to arrive at his estimate for the uncompleted portions.

*Answer:* If a bonding company, called upon to complete an unfinished contract, calls for new bids and furnishes to each invited bidder the original complete plans and specifications for the original job and extends to each bidder full opportunity to survey the work already done and to estimate the unfinished portions of such work, they have complied with Section 4, Article VII, Chapter I of the Code by prescribing terms of competition insuring parity of standing to all bidders.

## Uniformity of Information

Chapter I, Art. VII, Sec. 4

Responsibility for providing " requisite information which shall be sufficiently complete to enable each bidder to prepare a definite bid" rests upon the awarding authority. If the awarding authority is an architect,



general contractor or other "member of the construction industry," then such awarding authority is subject to the jurisdiction of the Code and action can be taken to prevent him from proceeding with the taking of bids without complying with Section 4, Article VII, Chapter I of the Code.

### Competitive Bidding Defined

Chapter I, Art. VII, Sec. 1(a)

An architect acting for his client requested a bid on a project from one electrical contractor without ask-

ing for any competitive bid. The electrical contractor submitted a bid and filed a copy of his bid with the bid depository, which was held unopened in as much as no second bid appeared.

The architect then called for competitive bids from a number of electrical contractors naming a definite closing time. Advise is requested relative to whether such invitation for bids is permitted under the Code after having invited and received a single bid.

Answer: Competitive bidding

means "the submission at or before a definite predetermined time of comparable proposals by two or more invited persons". In asking for a figure from only one electrical contractor the awarding authority had not instituted competitive bidding. The awarding authority may thereafter call for competitive bids at a definite closing time. The original bidder may submit a revised bid under such competitive bidding if he so desires, as every bidder is entitled to revise his bid up to the closing time for filing same with bid depository.

Table 1—Wattage for Lighting Commercial and Domestic Interiors

Based on the Use of 100 to 500 Watt Clear Lamps.

SPACE TO BE LIGHTED	Foot Cand. Rec-com.	WATTS PER SQ. FOOT								
		Direct Ltg.			Semi Ind. Ltg.			Indirect Ltg.		
		A <sub>33</sub>	B	C <sub>40</sub>	A <sub>33</sub>	B <sub>30</sub>	C <sub>20</sub>	A <sub>32</sub>	B <sub>25</sub>	C <sub>15</sub>
Auditoriums.....	3-5	0.3-0.6		0.5-0.8	0.5-0.9	0.6-1.0	0.9-1.6	0.6-1.0	0.8-1.3	1.3-2.1
Automobile Show Rms.	10-15	1.2-1.7		1.6-2.4	1.8-2.7	2.2-3.0	3.1-4.7	2.0-2.9	2.5-3.8	4.2-6.3
Banks.....	5-8	0.6-0.9		0.8-1.3	0.9-1.4	1.0-1.7	1.6-2.5	1.0-1.6	1.3-2.0	2.1-3.3
Lobbies.....	8-10	0.9-1.2		1.3-1.6	1.4-1.8	1.7-2.2	2.5-3.1	1.6-2.0	2.0-2.5	3.3-4.2
Cages.....	10-15	1.2-1.7		1.6-2.9	1.8-2.7	2.2-3.0	3.1-4.7	2.0-2.9	2.5-3.8	4.2-6.3
Barber Shop.....	10-15	1.2-1.7		1.6-2.9	1.8-2.7	2.2-3.0	3.1-4.7	2.0-2.9	2.5-3.8	4.2-6.3
Bowling.....	5-8	0.6-0.9		0.8-1.3	0.9-1.4	1.0-1.7	1.6-2.5	1.0-1.6	1.3-2.0	2.1-3.3
Alleys.....	15-20	1.7-2.3		2.4-3.1	2.7-3.6	3.0-4.2	4.7-6.3	2.9-3.9	3.8-5.0	6.3-8.4
Pins.....	3-5	0.3-0.6		0.5-0.8	0.5-0.9	0.6-1.0	0.9-1.6	0.6-1.0	0.8-1.3	1.3-2.1
Billiards.....	15-20	1.7-2.3		2.4-3.1	2.7-3.6	3.0-4.2	4.7-6.3	2.9-3.9	3.8-5.0	6.3-8.4
General.....	2-4	0.2-0.4		0.3-0.6	0.4-0.7	0.4-0.8	0.6-1.2	0.4-0.7	0.5-1.0	0.8-1.7
Tables.....	4-6	0.4-0.6		0.6-0.9	0.7-1.1	0.8-1.2	1.2-1.9	0.7-1.2	1.0-1.3	1.7-2.5
Churches.....	15-20	1.7-2.3		2.4-3.1	2.7-3.6	3.0-4.2	4.7-6.3	2.9-3.9	3.8-5.0	6.3-8.4
Aud.....	3-6	0.3-0.7		0.5-0.9	0.5-1.1	0.6-1.2	0.9-1.9	0.6-1.2	0.8-1.5	1.3-2.5
S. S. Rooms.....	10-15	1.2-1.7		1.6-2.4	1.8-2.7	2.2-3.0	3.1-4.7	2.0-2.9	2.5-3.8	4.2-6.3
Drafting Room.....	6-10	0.7-1.2		0.9-1.6	1.1-1.8	1.2-2.2	1.9-3.1	1.2-2.0	1.5-2.5	2.5-4.2
Garages.....	15-20	1.7-2.3		2.4-3.1	2.7-3.6	3.0-4.2	4.7-6.3	2.9-3.9	3.8-5.0	6.3-8.4
General.....	4-6	0.4-0.7		0.6-0.9	0.7-1.1	0.8-1.2	1.2-1.9	0.7-1.2	1.0-1.5	1.7-2.5
Shops.....	2-3	0.2-0.3		0.3-0.5	0.4-0.5	0.4-0.6	0.6-0.9	0.4-0.6	0.5-0.8	0.8-1.3
Gymnasiums.....	4-6	0.4-0.7		0.6-0.9	0.7-1.1	0.8-1.2	1.2-1.9	0.7-1.2	1.0-1.5	1.7-2.5
Main Floor.....	8-10	0.9-1.2		1.3-1.6	1.4-1.8	1.7-2.2	2.5-3.1	1.6-2.0	2.0-2.5	3.3-4.2
Hand B.....	10-15	1.2-1.7		1.6-2.4	1.8-2.7	2.2-3.0	3.1-4.7	2.0-2.9	2.5-3.8	4.2-6.3
Swim. P.....	4-6	0.4-0.7		0.6-0.9	0.7-1.1	0.8-1.2	1.2-1.9	0.7-1.2	1.0-1.5	1.7-2.5
Hospitals.....	8-10	0.9-1.2		1.3-1.6	1.4-1.8	1.7-2.2	2.5-3.1	1.6-2.0	2.0-2.5	3.3-4.2
Wards & Rms.....	10-15	1.2-1.7		1.6-2.4	1.8-2.7	2.2-3.0	3.1-4.7	2.0-2.9	2.5-3.8	4.2-6.3
Corridors.....	4-6	0.4-0.7		0.6-0.9	0.7-1.1	0.8-1.2	1.2-1.9	0.7-1.2	1.0-1.5	1.7-2.5
Rec. Rooms.....	8-10	0.9-1.2		1.3-1.6	1.4-1.8	1.7-2.2	2.5-3.1	1.6-2.0	2.0-2.5	3.3-4.2
Oper. Rms. Gen.....	10-15	1.2-1.7		1.6-2.4	1.8-2.7	2.2-3.0	3.1-4.7	2.0-2.9	2.5-3.8	4.2-6.3
Tables.....	4-6	0.4-0.7		0.6-0.9	0.7-1.1	0.8-1.2	1.2-1.9	0.7-1.2	1.0-1.5	1.7-2.5
Library Rdg. Room.....	6-10	0.7-1.2		0.9-1.6	1.1-1.8	1.2-2.2	1.9-3.1	1.2-2.0	1.5-2.5	2.5-4.2
Offices.....	10-12	1.2-1.4		1.6-1.9	1.8-2.7	2.2-2.5	3.1-3.8	2.0-2.3	2.5-3.0	4.2-5.0
Close Work.....	6-8	0.7-0.9		0.9-1.3	1.1-1.4	1.2-1.7	1.9-2.5	1.2-1.6	1.5-2.0	2.5-3.3
Ordinary.....	8-10	0.9-1.2		1.3-1.6	1.4-1.8	1.7-2.2	2.5-3.1	1.6-2.0	2.0-2.5	3.3-4.2
Schools:—	15-20	1.7-2.3		2.4-3.1	2.7-3.6	3.0-4.2	4.7-6.3	2.9-3.9	3.8-5.0	6.3-8.4
Class & Rdg. Rooms.....	10-12	1.2-1.4		1.6-1.9	1.8-2.1	2.2-2.5	3.1-3.8	2.0-2.3	2.5-3.0	4.2-5.0
Sewing Room.....	15-20	1.7-2.3		2.4-3.1	2.7-3.6	3.0-4.2	4.7-6.3	2.9-3.9	3.8-5.0	6.3-8.4
Man. Tr. Wood S.....	10-12	1.2-1.4		1.6-1.9	1.8-2.1	2.2-2.5	3.1-3.8	2.0-2.3	2.5-3.0	4.2-5.0
Man. Tr. Mach. S.....	15-20	1.7-2.3		2.4-3.1	2.7-3.6	3.0-4.2	4.7-6.3	2.9-3.9	3.8-5.0	6.3-8.4
Stores/Dark Goods.....	12-18	1.4-2.0		1.9-2.8	2.1-3.2	2.5-3.8	3.8-5.6	2.3-3.5	3.0-4.5	5.0-7.5
Light Goods.....	8-10	0.9-1.2		1.3-1.6	1.4-1.8	1.7-2.2	2.5-3.1	1.6-2.0	2.0-2.5	3.3-4.2
Show Windows:—	80-100	9.2-11.0		12.5-15.5	14.4-18.0	17-22	25-31	16-20	20-25	33-42
Large Cities.....	30-80	3.0-9.2		4.8-12.5	5.4-14.4	6.6-17.0	9-24	6.0-16	8-20	13-33
Medium Cities.....	2-3	0.2-0.3		0.3-0.5	0.4-0.5	0.4-0.6	0.6-0.9	0.4-0.6	0.5-0.8	0.8-1.3
Theaters.....	8-10	0.9-1.2		1.3-1.6	1.4-1.8	1.7-2.2	2.5-3.1	1.6-2.0	2.0-2.5	3.3-4.2
Auditorium.....	2-3	0.2-0.3		0.3-0.5	0.4-0.5	0.4-0.6	0.6-0.9	0.4-0.6	0.5-0.8	0.8-1.3
Lobby.....	0.1	0.01		0.02	0.02	0.03	0.03	0.02	0.03	0.04
Theaters—Movie:—										
During Intermission.....	2-3	0.2-0.3		0.3-0.5	0.4-0.5	0.4-0.6	0.6-0.9	0.4-0.6	0.5-0.8	0.8-1.3
During Picture.....	0.1	0.01		0.02	0.02	0.03	0.03	0.02	0.03	0.04

Letters A, B & C indicate condition of surroundings.

A—Light.

B—Medium.

C—Dark.

# Wattage Wiring Tables

BY RAY ASHLEY

TABLES for illumination usually give recommended foot candles, and seldom give recommended watts per square foot. In the accompanying table (Table 1), there are approximately 300 values given. If the types of fixtures and the various reflecting qualities of different colors were considered, there would have to be over a thousand values given. For instance, if an efficient type of fixture were used in a room with buff walls, the amount of useful light might be a hundred per cent greater than that received from an inefficient semi-indirect fixture installed in a room with french grey walls. In both cases the fixture would be of the same type, and the color of walls might be classed as medium.

In spite of all of these

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objections, a contractor will find the "watt per square foot table" very useful. In most cases at the time when he is called upon to make recommendations, or to figure feeder capacities, the fixtures have not been selected, and nothing has been decided about the decorations. Under such conditions, the table requiring the least amount of figuring is the most valuable.

The writer has been using tables similar to those shown, for several years and has found them very useful. One has to limit himself to the amount of data he carries around, and to get accurate calculations, there would have to be several tables available.

The reader will note that both the recommended foot candles, and the approximate watts per square foot are given in the accompanying tables. In case one feels that he should calculate the wattage required, he can do so by use of the following formula:

$$W = \frac{FC}{L \times UF}$$

W—represents watts per square foot.

FC—represents recommended intensity in foot candles.

L—represents the rated lumen output per watt of the lamp to be used.

UF—represents the utilization factor or percentage of useful light. (Ratio of the light delivered at the work, to the total light output of the lamps.)

For example, take an automobile show room, in a brightly lighted district, requiring a great deal of light. Let us assume the following:

- (1) Foot candles required—15.
- (2) Fixtures to be used—Semi-indirect type with 3—150 watt clear lamps each.
- (3) Walls to be buff (Medium light—approximately 50% reflection factor.)
- (4) Based on surroundings and fixtures, a utilization factor of 35% is selected.

From the lamp tables we learn that the lumen output per watt for a 150 watt clear lamp is 16.

THEREFORE:

$$\begin{aligned} FC &= 15 \\ L &= 16 \\ UF &= .35 \end{aligned}$$

$$W = \frac{15}{.35 \times 16} = 2.68$$

The range of L for standard lamps is from 14 for 100 watt lamps to 17 for 500 watt lamps. To strike a fair average, 16 was used for all calculations in making up the tables.

For U the following percentages were used:

Direct lighting.....	{ A—55% C—40%
Semi-indirect lighting.....	{ A—35% B—30% C—20%
Indirect lighting.....	{ A—32% B—25% C—15%

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Table 2—Wattage for Lighting Industrial Interiors

Based on the use of 100 W. to 500 W. Clear Lamps

SPACE TO BE LIGHTED	Foot Candles Recom.	WATTS Per Sq. Ft. Direct Lighting		
		A <sub>55</sub>	B	C <sub>40</sub>
<b>Assembling:—</b>				
Rough.....	4-6	0.4-0.7		0.6-0.9
Medium.....	6-10	0.4-1.2		0.9-1.6
Fine.....	15-20	1.7-2.3		2.4-3.1
<b>Bakeries</b> .....	8-12	0.9-1.4		1.3-1.9
<b>Candy Making</b> .....	8-12	0.9-1.4		1.3-1.9
<b>Clothing:—</b>				
Cutting—Light Goods.....	8-12	0.9-1.4		1.3-1.9
Cutting—Dark Goods.....	20-30	2.3-3.4		3.1-4.7
Sewing Light Goods.....	8-10	0.9-1.2		1.3-1.6
Sewing Dark Goods.....	15-20	1.7-2.3		2.4-3.1
<b>Engraving</b> .....	25-50	2.9-5.8		3.9-7.8
<b>Foundries:—</b>				
Moulding & Charging.....	3-5	0.35-0.6		0.5-0.8
Core Making & Chipping.....	8-10	0.9-1.2		1.3-1.6
Inspection—Medium.....	5-8	0.6-0.9		0.8-1.3
Inspection—Fine.....	15-25	1.7-3.4		2.4-3.9
<b>Laundries &amp; Dry Cl.</b> .....	8-12	0.9-1.4		1.3-1.9
<b>Machine Shop:—</b>				
Medium Work.....	5-10	0.6-1.2		0.8-1.6
Fine Work.....	10-15	1.2-1.7		1.6-2.4
<b>Paint Shop:—</b>				
Rough Work.....	5-8	0.6-0.9		0.8-1.3
Finishing.....	10-20	1.2-2.3		1.6-3.1
<b>Printing:—</b>				
Mach's. & Presses.....	6-8	0.7-0.9		0.9-1.3
Proof Rdg. & Lithog.....	10-15	1.2-1.7		1.6-2.4
<b>Sheet Metal</b> .....	4-6	0.45-0.7		0.6-0.9
<b>Shoe Mfg.:—</b>				
Benches & Mis. Mchs.....	8-10	0.9-1.2		1.3-1.6
Stitching—Dark.....	25-50	2.9-5.8		3.9-7.8
<b>Wood Working:—</b>				
Rough Bench & Mach. Wk..	4-6	0.45-0.7		0.6-0.9
Planers, Shapers, Etc.....	6-8	0.7-0.9		0.9-1.3
Finishing.....	10-15	1.2-1.7		1.6-2.4

A—Light surroundings.

B—Medium surroundings.

C—Dark surroundings.

With all of the variable factors, one is liable to wonder how it is possible to calculate the wattage, which will give exactly the amount of light wanted: it can't be done. With the best of calculations, the final results are often much farther from the anticipated results, than the ordinary layman would expect.

There is one rule to follow always. In case of doubt, take the safe value. The allowance of extra wattage may mean a slightly increased first cost but in all probability this extra cost will pay for itself many times during the lifetime of the building through reduced light losses and improved drop.

#### EDITOR'S NOTE:

For more complete table of recommended intensities, and for reflection factors of various colors, see National Lamp Works Bulletin No. 41-D. Lamp data may be found in Manufacturer's schedule.

# How to Avoid Mistakes in Ordering Panelboards

Prepared by the Panelboard and Distribution Board Section of the National Electrical Manufacturers' Association

Field inquiry discloses frequent complaints both on the part of contractors and manufacturers about expensive errors, delays and changes in panelboards and distribution equipment. As many of the problems have their root in poorly prepared specifications and inadequate information relative to the requirements of the job, it is hoped that this article will point out a way to avoid much of the trouble.

**W**HILE the tailor has his subject available for detail measurements, and we choose cloth samples and style plates to our taste (and pocketbook), panelboards are too often hurriedly ordered "Extra Rush," many of them extremely "tailor-made," with many important points of information left to the manufacturer's imagination. Small wonder then, that frequently a well constructed panelboard or distribution panelboard needs to undergo expensive remodelling, or is in some instances wholly or partially worthless for its specific purpose, as a result of omissions or misunderstandings in the order. The delays incurred, plus expense items and necessary back-charges leave in too many cases an unfavorable attitude toward the manufacturer, regardless of the source of error.

## Examples of Trouble

Some experiences, cited briefly, will best illustrate the problem, and should serve to emphasize the need for greater care by contractors in placing their orders.

(a) An order for seemingly standard, or catalogue panelboards, together with a main distribution panel for a 9-story rush job was received—"Rush panelboard boxes at once—Schedule and template for main panel next week." The subsequent feeder schedule and template for main panel disclosed cable sizes and conduit drillings for risers too large to be accommodated in standard gutters and depths of boxes al-

ready shipped to the contractor.

(b) A box was expressed for a 24-circuit catalogue panelboard. Upon finally ordering panel and front shipment, an innocent paragraph of job specifications was discovered by the contractor, and added to original order—requiring 6 circuits to be 3-way switched from the panel.

(c) A rush order for several 3-phase, 220-volt power distribution panelboards was placed in production for boxes. In the interim a change was made to 3-phase, 440-volts. The boxes were shipped and partially piped, when notice of the change in voltage reached the factory.

## Classes of Equipment

A fundamental understanding of panelboards as a general class of electrical equipment is best obtained by considering the subject under four groups of classes, viz.: Standard, or Catalogue types; Circuit Breaker types; Special, or Non-Catalogue types; and last but of equal importance, Replacements. It is not intended that this shall be a treatise on panelboard standards or construction, but rather a suggested procedure for writing specifications and placing final orders, to the end that the correct material may be furnished with the least possible delay or misunderstanding.

## Drawings and Specifications

Unless panelboards are positively Standard Catalogue types, a copy of the panelboard specifications should accompany the order, together with

an actual schematic riser plan in cases of panels grouped on one or more feeders. A rough sketch of the various Panel "Stacks" often catches some very important oversights in box depths, gutter sizes and sub-feeders.

## Catalogue Panelboards

Standard Catalogue panelboards may be specified and ordered by the Universal Catalogue Symbols as adopted by N.E.M.A. and shown herewith. These catalogue numbers should be supplemented by the following information:

1. Whether complete panelboard, box only, panel only, or panel and front.
2. Flush or surface mounting (flush is standard for branch lighting; surface is standard on other panels).
3. Special drillings, in case manufacturer's illustrated standard knock-outs can not be used.

Any deviation from actual catalogue description must be carefully stated, particularly where main buss capacity, box width or depth, sub-feeders, door construction, locks or finish are other than standard. Particular reference is directed to branch circuits which are to serve a special purpose, as for instance:

(a) Where circuits supplying transformers for gas tube signs are to be controlled by the panelboard switches, information should be given as to the load (amperes) taken by the transformer in order that

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switches of suitable design may be furnished.

(b) Where it is expected that circuits supplied through the panelboard will be in use at or near their rated capacity for periods of 12 hours or more per day, such information should be given in order that the panelboard may be suitably designed to handle such increased use above that expected for panelboards designed for general use.

#### Circuit Breaker Panelboards

Circuit breaker panelboards are, in a sense, a separate classification as several additional factors enter into their selection. Branch circuit lighting panelboards of the circuit breaker type are regularly equipped with 15-amp. breakers in all circuits, although any capacity up to 50-amp. may be had by specifying which circuits are to be increased. It is well to remember that if branch circuits are increased, mains should be increased accordingly.

First it should be noted that these breakers are of the thermal trip type calibrated to trip at currents corresponding to carrying capacities of rubber covered wire. They are manufactured in different frame sizes of the following maximum capacities: 50-amp., 100-amp., 225-amp., 400-amp., 600-amp. Each frame size may be calibrated at any capacity under its maximum. They are convertible to any other capacity up to the maximum capacity of the frame in the 50-amp. frame size by changing the complete unit breaker, and in the larger sizes by changing the trip unit only. Therefore, in ordering a circuit breaker panelboard it is necessary to specify not only the size of the tripping element, but also the frame size, unless the frame size is of the smallest size that will accommodate the trip unit desired.

#### Special Panelboards

Special or non-catalogue panelboards include all panelboards of other than strictly Catalogue type, which means catalogue panels with special features (such as sub-feeds, increased mains, etc.), and all distribution panels of other than the branch lighting circuit type.

No limit can possibly be estimated as to the actual number of special features that can be incorporated in a panelboard. To list these off separately, with all their "ifs, ands, and

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#### Key to Circuit Breaker Narrow Distribution Panelboards

Maximum Size Branch Circuit—50 Amp. Capacity.

<b>A2B</b>	<b>A3B</b>	Indicates 2 or 3 Pole, 50 amp. Frame Size, Branches Circuit Breaker
<b>2H</b>	<b>3H</b>	Branches for 125 volts Indicates 2 main Busbars (for Single Phase) or 3 main Busbars (for 3 Phase)
<b>04</b>	<b>08, 12 etc.</b>	Number of Branch Circuits
<b>L</b>	<b>AB</b>	L = Lugs only in mains AB = Circuit Breaker in mains
<b>050</b>	<b>100, etc.</b>	Amp. Capacity of main lugs or Circuit breakers

The above key corresponds to the standard of the Panelboard and Distribution Board Section of NEMA covering a system of standardized catalog numbers. The table below as applied to circuit breaker narrow distribution panelboards has generally been adopted by various manufacturers in the industry, and corresponds to a revision being considered by the Section for expanding and bringing up to date the original standard.

#### Key to Unit Sectional Panelboard Catalog Numbers

<b>N</b>		Single Fusing in Branches Solid neutral bar provided
<b>T</b>	<b>AB</b>	T = Tumbler Switches in Branches AB = Circuit Breakers in Branches
<b>P</b>	<b>C</b>	P = Plug Fuses in Branches C = Cartridge Fuses in Branches
<b>2</b>	<b>3, or 4</b>	Number of Busbars to which main cables connect, incl. neutral
<b>04</b>	<b>08, 12 etc.</b>	Number of Branch Circuits, (See 1933 Nat. Elec. Code, 1303g.)
<b>L</b>	<b>F, SF, AB</b>	Indicates type of mains. L = Lugs only; F = Combined Switch and Fuse (Convert Fuse); SF = Switch and Fuse, Dead Front, so arranged that access to fuses cannot be had until switch is in "off" position AB = Mains, Circuit Breakers
<b>D</b>	<b>D Not Required with Circuit Breaker Construction</b>	Door in Door construction, i.e.; Main door opening over both tumbler switches and fuses Inner door opening over tumbler switch handles only

#### Universal Catalog Symbols.

but" would consume a small size encyclopedia. It is not the intent of this article to prevent their use, but rather to suggest their intelligent use. Some are invaluable and some are a useless waste of money. In the main, a careful consideration of manufacturers' standards may eliminate a considerable number of difficulties. Certain standards have been set up in the industry which are the result of years of experience or actual tests in the field and in the laboratory. Consider what the manufacturer offers as standard. If it will serve the purpose, use it. Otherwise describe what is wanted, *in detail*. If in doubt as to just what the standard is consult the catalogue, or, if not completely described there, get in touch with the manufacturer or his representative.

#### Universal Reference Form

To cover the principal points involved in special panelboards, and to serve also as a handy reference for writing specifications, inquiries and orders for panelboards, there is offered here a Universal Reference Form. Due to the wide variation in

types—number of units, and other complex conditions in panelboard requirements, this form must be limited to general reference, rather than to serve as a take-off form, or listing sheet.

#### Replacement Orders

There is no surer way of getting what is wanted than to send the defective part, or a sample, to the factory. All manufacturers keep records of panelboards made, but these cannot be expected to describe the panelboard to the minutest detail. Give all the information on the nameplate—serial number, manufacturing number, and capacity. An estimate as to the approximate date of manufacture is invaluable. Consult the manufacturer's latest catalogue. It will probably show illustrations of various replacement parts, from which may be chosen an article that is like the part to be replaced. Refer to it by catalogue number.

With a little less haste, and a little more thought about the details, more panelboards will reach the job right, and at the right time to be installed when the job is ready for them.



# UNIVERSAL REFERENCE FORM

## General Information for Specifications and Placing Orders.

When Standard Panelboards, as listed in manufacturer's catalogues, do not fully meet the complete requirements of a particular purpose, or when Special Distribution Panelboards are required, the following references will be of aid in specifying the necessary features desired.

NOTE: "Section 1303-G" or "Art. 4," or other similar notations refer to the 1933 National Electrical Code.

### 1. SERVICE CONNECTIONS (Art. 4)

- A. Private plant or Public utility
- B. Outside source
  - 1. Overhead, or
  - 2. Underground
- C. Indoor source
  - 1. Private sub-station
  - 2. Utility sub-station
  - 3. Private plant switchboard
- D. Various wiring systems employed
- E. System characteristics (Specify details of each)
  - 1. Voltage
  - 2. DC, or Cycles and Phase
  - 3. Feeder System, 2-3-4-5 or 7 Poles
  - 4. Neutral or grounded phase wire

### 2. METERING PROVISIONS (Art. 4)

- A. Separate from panelboard equipment
- B. Integral with main distribution panelboards (Sect. 405)
- C. Transformer or self-contained metering
- D. Systems metered
  - 1. Sub-meters
  - 2. Demand-Power Factor-Offpeak, etc.

### 3. MAIN CONNECTIONS TO PANELBOARDS—GENERAL TYPES (Sect. 1303)

- A. Bare bus-bar riser systems (Sect. 515)
  - 1. Rectangular solid bars, or
  - 2. Round solid bars, or
  - 3. Hollow tubing
  - 4. Give exact details or design
- B. Lugs only (Sect. 203)
  - 1. Solder type, or
  - 2. Solderless connectors
- C. Fuse only mains
  - 1. Live face, or
  - 2. Dead front, or
  - 3. Safety disconnect
  - 4. Convertible—Non-convertible
- D. Externally operable switch
  - 1. Fusible, or
  - 2. Non-fusible
  - 3. Fusible, with safety interlocking fuse compartment
- E. Automatic circuit breaker (Sect. 805-806)
  - 1. Air break, or
  - 2. Oil break
  - 3. Specify number breaker poles—Number trip coils (Sect. 806-O)—Other protective features desired
- F. Remote controlled contactor
  - 1. Fusible—Non-fusible
  - 2. Latched-in, or magnetically held
  - 3. Number and type of control stations
- G. General References:
  - 1. Select type main connections desired for each branch or distribution panel
  - 2. Ampere rating required (Art. 8 and 20)
  - 3. Number grounded and un-grounded poles (Sect. 806-o)
  - 4. Neutral or grounded phase terminals for all controlled conductors (Sect. 2004-b)
  - 5. Size and number conductors per pole (Sect. 612: Art. 8 and 20)
  - 6. Size feeder conduit (Sect. 503)
  - 7. Mains Connect at
    - Top-Bottom, or
    - Left-Right sides of panel

### 4. BRANCH CIRCUITS—LIGHTING and/or APPLIANCES (Sect. 1303)

- A. Type circuits employed (Art. 20)
  - 1. 2-wire, 2-fuse, or
  - 2. 2-wire, Solid neutral, or
  - 3. 3-wire, Solid neutral
- B. Circuit control and protection
  - 1. Plug type fuse connections only, or
  - 2. Tumbler switches—1, 2, 3-pole, or 3-way, with
    - a. Plug fuse connections, or
    - b. N. E. C. cartridge type fuse connections
  - 3. Automatic circuit breakers—1, 2, or 3-pole
    - a. 15-amp. trip, or
    - b. Up to 50-amp., as specified
  - 4. Sub-master controls for groups of sectionalized circuits as specified
    - a. Manual control—Type and capacity
    - b. Remote controlled—Type and capacity
    - c. Bussed to sub-master—Cutter jumpers
  - 5. Neutral terminal bus (Sect. 2004-b)
- C. General Reference:
  - 1. Designate for each panel such circuits as are of special capacity or design
  - 2. Specify total number of circuits including spares (Sect. 512-r; Art. 20)
  - 3. Assign each panel a number or alphabetical designation

### 5. SPECIAL FEATURES—BRANCH PANELBOARDS (See Catalogue Illustrations)

- A. Extra mains—Above or larger than Catalog Standard.
- B. Sub-feeders
  - 1. Number desired; size of each and type
    - a. Feed-through lugs only
    - b. Fuse connections only (Type)
    - c. Switch and fuse (Type)
  - 2. Check carefully required increase of main bus capacity
- C. Split or Sectionalized main busses (By sketch or detailed description)
  - 1. Type connections for each group
  - 2. Bussed, or gutter jumpers
- D. Blank Spaces for future features or equipment

### 6. SPECIAL DISTRIBUTION PANELBOARD CIRCUITS (For feeders, sub-feeders and motors)

- A. Live face or dead front
- B. Convertible or non-convertible
- C. Fuse connections only, or
- D. Fusible switches
  - 1. Knife (Live face), or
  - 2. Pull-out or hinged type combination fuse and disconnect, or
  - 3. Tumbler—(60-amp., 250-V max. capacity), or
  - 4. Brush—other safety type
    - a. Non-interlocking, or
    - b. Safety type interlocking fuse compartment cover
- E. Circuit breakers—Air or oil-break.
  - 1. Number poles
  - 2. Number trips (Sect. 806-o)
  - 3. Range calibration
  - 4. Remote tripping circuits
  - 5. Special protective features
  - 6. Number and capacity spare spaces
- F. Blank spaces for future
  - Specify amperes for each



- G. State system characteristics  
(See Reference I-E)
- H. Determine ampere capacities from careful checking of (Art. 8 and 20)
- I. Name or number each panel
7. DESIGNS FOR SPECIAL DISTRIBUTION PANELS
- A. Small or medium sizes—(Few branches-moderate capacities)
1. Tall and narrow panel, with single branch-busses vertical
    - a. Left—right hand main busses
    - b. Top—bottom main connections
  2. Medium proportion panel, with double branch-busses vertical near center
    - a. Mains top-bottom
  3. Low, wide panel, with single branch-busses horizontal
    - a. Left-right hand main connections
    - b. Special door construction
  4. Limited space, ample depth
    - a. Rear or side access compartments
- B. Large sizes—(Large number circuits—assorted capacities)
1. One large cabinet—One panel
  2. One large cabinet—Two or more panels
    - a. Jumpered, inter-connected mains, or
    - b. Multiple main feeders
    - c. Main connections each panel—State size
  3. Special shaped cabinets
    - a. L shaped—U shaped or back to back
    - b. Jumpered or bussed panel inter-connections.
  4. Separate cabinets—Separate panels
  5. Specify space limitations, if crowded
  6. Check size of room openings for box delivery
  7. Check proximity of main connections in relation to
    - a. Service entrance
    - b. Service switch or breaker
    - c. Current transformers
 (For cable length economy)
  8. Arrange multiple panels and major conduits to minimize cable crossings in gutters
8. BUS-BAR CONNECTIONS
- A. Face of panel, or in rear of panel
- B. Meter loops bussed to gutter
- C. Current transformer connections
1. Busses to gutter, or
  2. Bus connected to panel-mounted transformers, front or rear
- D. Miscellaneous connections
1. Resistors—Contactors, Relays  
(Give full details)
- E. Sectionalized panel groups  
(Sketch or details)
9. PANEL MATERIALS
- A. Slate-Marble-Ebony Asbestos
- B. Moulded composition units
- C. Steel or composition blanks and covers
- D. Finish or color
10. COPPER FINISHES
- A. Standard satin finish, or
- B. Special polished copper, or
- C. Special draw file
11. SWITCH AND FUSE CONSTRUCTION
- A. Manufacturer's standard, or
- B. Special type "A"
- C. Quick break attachments
- D. Special fuse jaw tension clamps
12. NAME PLATES—CARD HOLDERS
- A. Manufacturer's standard design, or
- B. Special etched copper per detail
- C. Special card holders per detail
13. CABINETS FOR BRANCH OR DISTRIBUTION PANELBOARDS (Art. 7 and Sect. 1303)
- A. Standard general duty, or
1. Weatherproof/tight - Dampproof/tight - Dust-proof/tight
  2. Vaporproof/tight—Waterproof/tight
  3. Give details if particular design desired
  4. Gaskets standard, unless otherwise stated
- B. Finish—Manufacturer's standard, or
1. Plain steel, black japan, lacquer,  
Special paint, specify in detail
  2. Galvanized sheet, or Hot-dipped galvanized, or cadmium plated
- C. Specify separately for box and trim if different
- D. Boxes only:
1. Gauge—Standard, or special gauge \_\_\_\_\_
  2. Gutters—Standard, or special size \_\_\_\_\_ inches
    - a. All around, or sides only
    - b. Top and/or bottom
  3. Depth—Standard, or special depth \_\_\_\_\_ inches
  4. Extra features—Give details or sketch (Sect. 512-s)
    - a. Junction space (Sect. 703)
    - b. Compartments—dividers
    - c. Cable racks—Terminal blocks
    - d. Side doors—Side plates
    - e. Ventilating grilles
    - f. Special reinforcing members
    - g. Sectional—Assemble at job
  5. Drillings—Standard catalogue, or  
Special template from customer
  6. Space Limitations—Unlimited, or
    - a. Maximum depth available \_\_\_\_\_
    - b. Maximum width available \_\_\_\_\_
    - c. Maximum height available \_\_\_\_\_
- E. Fronts only
1. Manufacturer's Standard, or
    - a. Special attachment to box \_\_\_\_\_
  2. Gauge—Standard, or special gauge \_\_\_\_\_
  3. Standard single door, or door-in-door  
(Branch circuit panelboards)
  4. Solid, or sectional trim
  5. Special trim drillings
    - a. Meter loop busings (Give detail)
    - b. Pilot receptacles—Bracket lights
    - c. Miscellaneous control switches
  6. Special door construction
    - a. Split doors
    - b. Double-triple—Jack-knife
    - c. Special swing per details
  7. Hardware—Standard, or special:  
Vault handles, Shoot bolts  
Knobs, Locks, Plating, Directory  
Frames, Card Holders, Name plates  
Always furnished to manufacturer's standard design, unless otherwise specified in detail
14. FOREIGN APPARATUS OR EQUIPMENT
- A. Time clocks—Contactors—Relays—Control switches—Fuses—Resistors—Instruments—Metering transformers, etc.
- B. How Furnished:
1. By manufacturer and built in at factory, or
  2. By others, shipped to, and built in at factory, or
  3. By manufacturer, shipped to job, and installed in panels per template, after panels are set
  4. Furnished and shipped to job, by others; factory to make provisions for, from templates furnished
  5. Furnished by manufacturer but mounted separately from panels
- C. Details of Apparatus or Equipment
1. Supply Make—Type—Dimensions or detail prints
  2. Specify panels in which to be installed
15. PRODUCTION AND SHIPMENT
- A. Shop Drawings
1. Number required and date wanted \_\_\_\_\_
  2. Submit upon completion to \_\_\_\_\_
  3. None needed for standard panels \_\_\_\_\_
  4. Typical prints for standard panels \_\_\_\_\_
  5. In detail for panels \_\_\_\_\_
  6. Special sections required for panel \_\_\_\_\_  
(Describe detail needed)
  7. Connection diagram needed for panel \_\_\_\_\_
- B. Production
1. Defer until approval drawings, or
  2. Ship boxes at once—Panels will advise later
    - a. Use standard template for boxes \_\_\_\_\_
    - b. Special templates attached for \_\_\_\_\_
    - c. Special templates later for \_\_\_\_\_
  3. Shipping Dates—Boxes \_\_\_\_\_ Via \_\_\_\_\_  
Panels \_\_\_\_\_ Via \_\_\_\_\_  
Fronts \_\_\_\_\_ Via \_\_\_\_\_  
Apparat. \_\_\_\_\_ Via \_\_\_\_\_

# Contractors' Compensation

## WHY INDUSTRIAL CONTRACTOR NEEDS MORE MARGIN

Editor,  
ELECTRICAL CONTRACTING:

We have been very much interested in the letters published by your magazine criticizing the trade discounts in vogue in the electrical industry. Most of the criticisms apparently come from industrial electrical contractors, that is, firms operating a combination business which includes construction work, repair shops, and a supply and equipment sales department.

It may interest you and some of your readers to know that aside from the fact that everyone likes to make more profits, there is a very good business reason why the matter of discounts is so important to the industrial contractors.

The following figures, developed by the last five years' operation of our business (which is a combination business), explains the matter quite clearly:

	Per cent of selling price
Material cost, supplies and equipment (all depts.)	51.4%
Labor cost (shop and construction)	18.2%
Overhead (all depts.)	26.6%
Net profit	3.8%
	100.00%

From these figures it is apparent that any improvement made in the margins on supplies and equipment will affect our net profits more than similar treatment of our combined labor and overhead. Under the circumstances, it is a matter of good business judgment to try to improve conditions by concentrating on that phase of your operations which can produce the greatest results.

It would take a large saving in labor cost to equal a relatively small saving in material cost, and a considerable saving in overhead would be required in order to equal a relatively small saving in material cost. It is not in the cards to make a large saving in labor cost, nor is it possible to make an appreciable saving in overhead, and operate one's business according to modern standards. Naturally,

therefore, the contractors are endeavoring to improve their margins by constantly emphasizing and pressing the issue.

You will observe that the overhead of the entire business is 26.6 per cent of the gross business; the shop overhead is higher, the construction department overhead lower, and the sales department overhead, strange as it may seem, is 26 per cent or the same as the average overhead for the entire business.

Breaking down the activities of the sales department into three lines of endeavor (used equipment, supplies, and new equipment), we find that the overhead for these three classifications varies only 1 per cent above and below the average of 26 per cent for the department. Used equipment produces a comfortable net profit; supplies, a small net profit; but new equipment, because of the inadequate margins, a sizeable loss.

### New Equipment

Under the circumstances, one wonders why we sell any new equipment at all. If the matter were that simple, we would not. As a matter of fact, our major efforts and thoughts are all devoted to construction work, shop jobs, and second-hand equipment sales. However, as long as we are in the business, the industry expects us to handle all those things that logically go together, and there is where the rub comes in, so to speak.

About half of our sales department activities are devoted to service and engineering, incident to the sales of new equipment. Therefore, as it stands today, the sales of new equipment are nothing more nor less than a necessary evil.

Good business judgment dictates that we be seriously interested in the margins on new equipment simply because we want to convert this phase of our business into an asset. The smaller manufacturers, recognizing the situation, are offering discounts more nearly in line with the requirements. The large manufacturers, however, still persist with their obsolete advertising and commercial programs, trying to broaden markets and

create demand by low prices to the consumer, while retarding the consummation of the sale with unprofitable margins for the dealers. Dealers, in a sense, are like employees of an industry—they must earn more if they are to spend more, do a good commercial job and enjoy a satisfactory credit position.

We handle between 6,500 and 8,300 transactions (construction, shop jobs, and individual sales) per year. The average overhead per transaction is \$11.00. The sales department alone handles 5,000 transactions a year with an average overhead per sale of \$6.00. It costs good money to sell the electrical idea and if the contractors are to do their share of the work, they must be adequately remunerated.

When one considers the millions of dollars of new equipment which industrial contractors sell annually, more or less against their wishes, is it not strange that the manufacturers who pride themselves upon their vision and modern methods avoid doing the one thing that would turn the apathy of the contractors into an aggressive sales medium that would sell much more.

Certainly the industrial contractors have proved themselves worthy of the industry's encouragement and confidence, in spite of the weaknesses of motor brokers and their kind. There can be no foundation to the oft-repeated statement that "we give our margins away." The figures very clearly show that we must be making and conserving considerably more than 26 per cent on most of our operations, otherwise we could not show any net profits.

The depression years have been a test of one's business efficiency and the services rendered must be commensurate with the cost of 26 per cent, otherwise industries would not do business with us and we could not survive. Many contractors went through 1933, the lowest of the depression years, with a small net profit, in spite of the losses on new equipment. Obviously this could not have been accomplished with a 26 per cent overhead if it was seriously out of line with the character of the business.

*Electrical Contracting, August, 1934*

Discussions which I have had with others operating similar businesses indicate that the facts and ideas given herewith are common to industrial contractors. Under the circumstances, the contractors are showing good business sense by devoting their major energies to the sale of other things than new equipment and by urging upon the manufacturers the need for greater margins.

F. E. BOYD,  
Vice-President and Manager,  
Pacific Electric Motor Company.  
Oakland, Cal.

### LEAVE THE RETAIL TRADE TO THE CONTRACTOR

Editor,  
ELECTRICAL CONTRACTING:

The Minnesota Electrical Council which represents a majority of the substantial electrical contractors in Minnesota has been at work during the past year gathering evidence and facts, and analyzing the policies and practices that have led to the present most chaotic conditions. Outstanding among the reasons for these conditions is the extreme competition which jobbers, and sometimes manufacturers, create against the contractors by their almost ridiculous efforts to gain sales volume at the expense of contractors.

It has been said nationally, as well as locally, that the contractor dealer is a poor salesman; that he loses money and is generally a poor businessman and a poor credit risk. Let us analyze these charges. In the first place it must be admitted that there are some super-salesmen among the contractors, for they are out getting business every day at prices 20 to 50 per cent higher than those quoted by jobber's salesmen and by manufacturers. The contractor must get this profit or be wiped out of existence. How and why the contractor dealer is able to get more money ought to give the jobber and manufacturer something to think about, and refutes the charge so generally made that the contractor is no salesman. Most jobbers and manufacturers still admit that the bulk and backbone of their business comes through the contractor dealer, yet these same jobbers and manufacturers offer the most unconscionable competition to their most loyal customer, the contractor.

If the contractor loses money because he is a poor businessman, what

must we think of those jobbers who have lost fortunes during the past few years and are still "in the red"? Since most of these jobbers have tightened their credits until contractors are either fairly good pay or C.O.D. accounts, we must conclude that the jobbers are (1) poor salesmen, (2) poor credit managers with respect to financing dealers who take work at unsound prices, or (3) that they are losing more on their so called industrial accounts than they are on the contractor accounts. A fourth and more apparent reason to us is that the wholesaler, and some manufacturers, are attempting to do a retail business at wholesale prices.

Think of the jobber maintaining outside salesmen, not to help contractors but to compete with them! Not to advise them, or to promote new merchandise and selling ideas through the jobbers' best friend, but to go out and take the business away from him. And that by the most unfair means—by prices lower than the contractor can sell at—in some cases lower than he can buy at. Such sales are actually made at big losses by jobbers, reflected in their operating statements, or perhaps cloaked by the accounting of parent companies. What contractor can relish or long resist such methods?

By such pressure, contractors are permitted to contract or sell labor only, and on this alone they cannot exist. Their experience and ability to direct labor and properly install materials and equipment should be, and is, a proper accessory to increased sales. What has the present policy of the industry done? Who undermined the contractor's morale and crippled his natural selling advantages? Everytime a contractor goes out to sell, he finds not one, but several jobbers' salesmen there first, not selling service at a profit, but trying to get the order away from some other wholesaler or manufacturer. And are these all so-called industrial accounts worth the time and effort of the jobbers' "expert" salesman? Once they were—but no more. The industrial field became too hard to crack, and the salesmen's commissions too small, so now they sally forth to the village brewery, creamery, flour and feed mill, corner filling station (even the independents) until they are down to the level of the humble beer parlor. They must make the sale—regardless of the

poor contractor who might get run over in the rush.

Give the contractor back this retail business that rightfully belongs to him. Protect his profits. The wholesaler and manufacturer cannot sell this retail trade at a profit. The contractor did it until industry policies ruined his business.

If our industry cannot protect the profits which rightfully belong to the contractor by adopting sane selling policies, and if other business cannot pay an electrical contractor his moderate fee for services rendered, then there is no such thing as business recovery in sight and business as a whole does not deserve to succeed.

### National Accounts

Two more points remain. First, whoever of our smart manufacturers invented the "national" account, and why did nearly everybody follow into the same pit? Was it not a case of the blind leading the blind? It was not enough for the manufacturer's super sales force to convince the Mammoth Oil Company or the Humpty Dumpty Stores that they should adopt "Whoosis fixtures" or "Whatsit switches" as standard throughout the nation, but this same super sales force convinced these buyers that they should buy them at less than the contractor's cost, even though they needed only two or three here and a half dozen somewhere else. Or is it possible that the purchasing agents outsold the super salesmen and put these ideas across?

Oh yes, the factory gives real service to these accounts—out of the jobber's stock; and the jobber is tickled pink to take 10 per cent less than the contractor is asked to pay. Shades of Fair Competition! To be sure, the industry is generous. It permits the contractor to hang the fixtures and install the switches, because we have not found a way yet to deliver labor in packages at special prices to chain buyers or industrial accounts.

From this you may gather that we are in favor of at least 20 per cent protection on the selling price—25 per cent on cost—of all electrical construction materials or apparatus—regardless of the methods of distribution.

W. A. RITT, Secretary-Manager.  
Minnesota Electrical Council.  
Minneapolis, Minn.



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# electrical contracting

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*With which is consolidated Electrical Record*

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S. B. WILLIAMS, Editor

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## SALES CONTROL ORDINANCES

A FRESH activity in electrical sales control ordinances is noticed in a number of places. It is a progressive movement. There are far too many unapproved appliances and wiring materials on the market. As the number of such ordinances grows the need therefore in other places will become more pressing because of the dumping there by manufacturers of substandard equipment.

It is hoped, however, that some standard measure is proposed whereby "approved" means the same thing in every city. And finally we urge those places that secure such an ordinance to sell the public on it by a well-thought out publicity program over a long period after the law is in force.

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## FRIENDS OF THE CODE

AT the annual meeting of the National Fire Protection Association in May, A. R. Small, chairman of the Electrical Committee, reported on a series of meetings that had been held this spring to discuss the future of the National Electrical Code. These meetings were perhaps both fortunate and unfortunate. Unfortunate in that they resulted in a condition of confusion and mistrust, but fortunate in that they brought out sharply the strength of the friends of the Code.

These meetings were called by a group of power company engineers, and although they had been active in the councils of the Edison Electric Institute, they were not acting officially at these meetings. Moreover, it is our understanding that while manufacturers were present at these meetings, NEMA was not officially represented. It is to be regretted that those who sponsored the meetings neglected to take into

consideration all of the electrical interests. Whether this was deliberate or merely an oversight is immaterial. It did, however, arouse mistrust and brought forth the allegation that certain interests were in collusion in secret meetings.

While the whole situation was not so serious as it appeared, it has demonstrated very effectively that the inspectors are beginning to sense their collective power and from this point on we can expect to see them express themselves in greater unity when they feel that the integrity or the position of the Code is being endangered.

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## ORDERING PANELBOARDS

THROUGH the cooperation of the manufacturers we are able to present in this issue an authoritative article on the ordering of panelboards. There is probably no single piece of electrical equipment with which there are more purchase errors than with panelboards. The problem, of course, is due to the fact that those who lay out the wiring, or write the specifications, or do the purchasing neglect to take into consideration all of the different ramifications of the job and its possible peculiarities.

The contractor cannot expect a manufacturer to be a mind-reader nor should he expect the manufacturer to assume the burden of correcting a mistake not of his own making without compensation. There are many cases, however, in which this happens and even then the contractor has to pay a big price in customer displeasure.

The present article should be kept and referred to whenever a panelboard of other than a standard catalog number is ordered. It will help to reduce delays, reduce extra costs and to maintain good relations with the customer.

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## MORE INSPECTORS

ONE of the unfortunate occurrences during the depression was the serious reduction, and in some cases elimination of electrical inspection work. Many of these reductions were made in a moment of depression hysteria. City Fathers besieged on all sides to cut municipal expenses, blindly wielded the axe. While the depression is not over and our municipalities are far from being out of their tax difficulties, the depression hysteria has gone. Officials



are now willing to listen to proposals for the improvement of municipal operations.

In Cleveland, Ohio, and Portland, Ore., the local electrical contractors, in cooperation with the city inspection department, have made studies of the effectiveness from the standpoint of the city of an increased electrical inspection department. The Cleveland study has been completed and the result is that the inspection force has been increased and further increases will come later. The efforts of the new men will be devoted to reinspection.

The Portland study is not yet completed but should be ready very soon.

We cite these two instances merely to show that in cities where contractors are being handicapped by limited inspection departments, either in the work of inspection of new buildings, elimination of bootlegging or in reinspection, they work with their inspection departments to develop such facts and figures as will give the cities adequate reason for expanding the inspection departments.

#### BID DEPOSITORIES

PROBABLY the most important part of the Code of Fair Competition is that relating to bidding practice. It was developed after a study of the basic evils of the industry in order to eradicate practices whereby one person secured an unfair advantage over another. There is, however, nothing in the code designed to give any member, or group of members of the industry any unfair advantage over the public. In fact, the greatest danger that NRA codes face today is the possibility that industries, through selfish motives, will use the cooperative power of the codes to deal unfairly with the public.

The industry has been very careful in its rules on competitive bidding to take into consideration the more likely possibilities for collusion. In the first place, the code is very specific with respect to the location of bid depositories. It must be a bank or trust company or other agency approved by the divisional code authority. Where an agency other than a bank or trust company is selected, extreme care must be used to be sure that the agency is one that will not permit any unauthorized opening of bids. It must be an agency that permits free usage by all members of the industry. To select, for instance, the office of the local association as a bid depository would be a mistake.

No matter how honest the association might be in this connection, it could never be free from the suggestion that perhaps all was not well.

The code also is very definite in the time of opening of bids in the depository. Such copies of bids are not to be opened until after the contract has been awarded. This, in other words, permits no preview of the bids. If a contractor has made a mistake he must abide by it and answer for that mistake to the local administrative body if called upon for an explanation. It should not be possible under the code for anybody to secure knowledge of a contractor's bid prior to the opening of the bids. Unless this rule is followed without deviation, we will have made no progress against one of the worst of the bidding evils.

We can sympathize most heartily with the intention of some local communities that might want to go beyond the code knowing, as we do, what their problems are. On the other hand, the industry must be content, at least for the time being, to limit its activities to securing benefits that are permitted by the code without putting further restrictions on the industry or the public.

#### ANY SIZE HEAD

THERE is a village barber down in the Missouri Ozarks with a sign on his shop window

"Hair Cuts

25c

Any Size Head".

Heads, after all, cannot vary a great deal in size so the barber is reasonably safe, but what about the contractor who wires rental-ranges on the same basis?

Of course, it is much simpler to quote a flat price—and it is much simpler for the utility to pay a flat price. But how was that price figured? Was the price built up by including a factor for the unusual construction, or extra long runs, or suburban or rural deliveries? Did the price take into consideration a delivery to a customer out in the country who was not at home and had left no key?

When you are figuring "any size head" these things must be taken into consideration. Don't figure a flat price for wiring rental ranges based upon an ordinary house giving no trouble unless you can charge extra for extra expenses.

# \\ code chats ///

A MONTHLY DISCUSSION OF WIRING PRACTICE AND QUESTIONS OF INTERPRETATION, PRESENTED WITH A VIEW TOWARD ENCOURAGING A BETTER UNDERSTANDING OF THE NATIONAL ELECTRICAL CODE

CONDUCTED BY F. N. M. SQUIRES

CHIEF INSPECTOR, N. Y. BOARD OF FIRE UNDERWRITERS

## ISOLATED PLANT VOLTAGE

*What is the advantage (4001) in only using 0-50 volts in isolated plants instead of 110 volts, especially when larger wires must be used for the higher current?*

With isolated plants it is quite convenient to have storage batteries so as not to have to run the engine all night in order to have light available. If a 110 volt plant were used this would mean fifty-five or more cells of battery. Therefore, most isolated plants are of 32 volts requiring but about sixteen storage cells.

It is much cheaper to wire the circuits with No. 12 or No. 10 wire and place not over eight outlets on a circuit, than to buy and maintain some forty extra storage cells.

Note that Article 40 does not say that isolated plants shall have a potential of 50 volts or less. Many such plants are of the conventional 110 volts, but where the voltage is 50 or less then the rules of Article 40 apply.

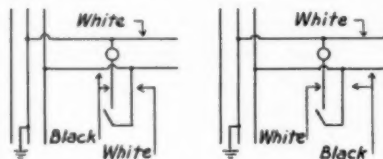
## POLARIZING AT OUTLETS

Rule 2001 (f) states that white or grey covered wires shall be used only for identified (grounded) wires, "except that single-pole switch loops in circuits wired with armored cable—may contain a white or natural grey conductor if the connections are so made that the return conductor from the switch to the outlet is black or a color other than white or natural grey." The quoted passage was inserted, of course, to permit the use of two-wire cable having one black and one white wire.

It seems to me, however, that connecting the white wire to the un-

grounded conductor is the wrong procedure. The white wire then becomes the "hot" leg, and accidents might result from the natural assumption that it was the grounded conductor. If the connections were reversed, however, as shown in sketch B below, the black wire becomes the "hot" leg, and the white wire, while not at ground potential when the switch is closed, is at least on the grounded side of the supply circuit, and accidental grounding of it with the switch open could cause no damage or injury.

Perhaps there is some reason for this connection which I have missed. If so I should appreciate being enlightened.



Our correspondent has given thought to the wires at the switch outlet rather than to those at the fixture outlet. The rule quoted above considered the fixture outlet to be the one at which polarization is necessary as that is the outlet where current is consumed and where the wiring and the sockets are to be polarized.

The rule (2001-f) therefore provides a method whereby both a black and a white wire are presented on which to connect a fixture so that the fixture may be properly polarized.

There seems to be no particular need for polarization at switch outlets as generally only flush or other enclosed switches are used and nothing but an insulated handle is accessible after completion of the work.

Of course, if an open knife switch

were to be used, then it would be better to have the blade not so connected as to be live when the switch is open. As those cases are in such a small minority, it would be better to secure this connection by means of painting the end of the wire to indicate which wire was to go to the blade, than to change the rule.

## GROUNDING ELECTRIC RANGES

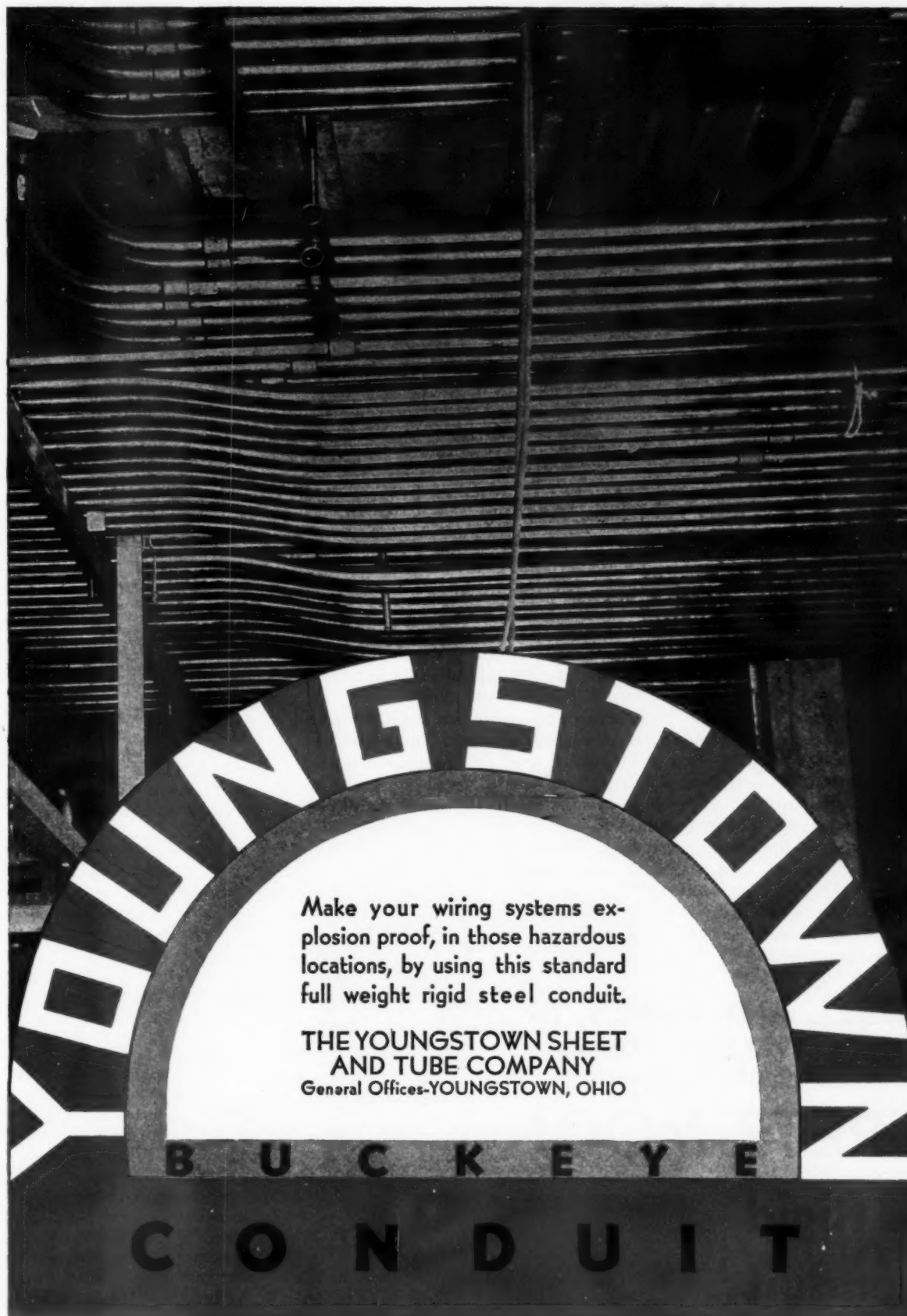
In many parts of the country electric ranges are being grounded through the neutral wire in installation where range receptacles are used.

I understand that some inspection departments do not allow the frame of the range to be grounded through the neutral wire and would like to know what your opinion is on this matter.

While rule 908-i gives three ways in which fixed equipment may be grounded and grounding to the neutral wire is not one of them, sub-paragraph 4 of 908-i says that "By permission, of the authority enforcing this Code, other means for grounding fixed equipment may be used". Most inspection departments are not giving permission for grounding equipment to the neutral conductor and very rightly so.

Such grounding might be safe enough where efficiently effective grounding all the way between the range and the ground at the service and then to earth could be secured. It should not be permitted where there is any doubt about it, for if the ground is lost or has very much resistance to ground the whole frame of the range may become "live", and there is generally plenty of other grounded objects near enough to the range to present a dangerous hazard.

Electrical Contracting, August, 1934



Make your wiring systems explosion proof, in those hazardous locations, by using this standard full weight rigid steel conduit.

**THE YOUNGSTOWN SHEET  
AND TUBE COMPANY**  
General Offices-YOUNGSTOWN, OHIO

**YOUNGSTOWN**  
**BUCKEYE**  
**CONDUIT**



## NO TWO PEAS



## CAN EQUAL FRETZ-MOON UNIFORMITY

How many times have you used the old simile—"Alike as two peas in a pod?" And yet it is doubtful if you will ever find a pod in which there are two peas absolutely uniform in likeness. Both may be green, just as all black conduit is black, or all galvanized conduit is galvanized. Both may be round in shape. But examine them closely, and you'll find, just as when you examine conduit closely, that there's a difference.

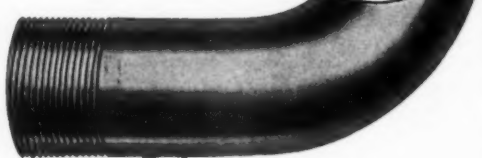
The uniformity of no two peas in any pod grown can equal the uniformity of Fretz-Moon Conduit, for here is a conduit that can be nothing but uniform. It is made by a scientifically-controlled "continuous process," automatic in operation, which takes the steel skelp at one end of a specially-designed furnace and deposits it in the form of lengths of pipe on the cooling racks. The skelp, especially made for this process, is structurally and physically uniform—the finished pipe retains this, plus uniform weld, size, roundness, straightness, ductility and cleanliness. That's why users say, "Alike as two lengths of Fretz-Moon Conduit."

Finished in black enamel, or in electro or hot-dipped galvanizing.

**STEEL AND TUBES, INC.**  
CLEVELAND • OHIO  
EXCLUSIVE SALES AGENTS

# FRETZ-MOON

**Rigid  
conduit**



## SHOULD ADEQUATE SERVICE BE PROVIDED?

A service change is necessary in a six apartment house because of a 10 K.W. range installation. The present service is 120-240 volts 3-wire No. 8 in 1 in. conduit fused at 35 amperes—maximum capacity of 16.8 K.W. This service has been apparently adequate for the demand load in this apartment.

1. What size shall the new service be and by what method shall its size be determined using the 1933 National Electric Code as a standard?

(A) Six apartment house—6000 sq. ft. floor area.

	Square Feet	Demand	Load
First	2000	100%	2000
Next	4000	70%	2800
1000 watts per tenant for appliances (No demand).....6000			
1—10 K.W. range—demand 80% .....8000			

Total 18.8 K.W.

Using this method 3, No. 2 would be necessary.

(B) Assuming present service ample for present load or that the demand has never exceeded ..... 8.4 K.W. and that the demand for the additional 10 K.W. range—1933 Code Article 20—80% ..... 8.0 K.W.

Total 16.4 K.W.

Using this method—2 No. 4 and 1 bare No. 6 fused at 70 amp. and using the present 1 in. conduit would be ample.

2. Is it practical to use a part of Article 20—as in (B)—(the range demand) without allowing for some additional capacity for appliances?

By all means some degree of adequacy should be provided at this time. The use of appliances is increasing to such an extent that advantage should be taken of the present required alteration to prevent another increase of the service in the near future. The owner of the apartment should be shown that a small additional expenditure will save a much larger one a little later.

Therefore, rule 2011 should be applied and 3 No. 2 wires provided. Of course, for the service (and only up to the service equipment) No. 2 R.C. and 1 bare No. 4 wire could be used. On the house side of the service equipment only insulated wires could be used which would mean 3—No. 2.



# RE-DISCOVER

## *The Forgotten Profit on Forgotten Items in markets*

unsaturated,  
unexplored by  
competition

1917

3340

6872

1916

7762

50715-C

7799

7073

PROFIT BY THE COMPLETE H & H LINE

"H & H" is recognized as the most complete Line of Wiring Devices . . . Complete not only in staple items, but in devices specially designed for specific markets and uses.

Pictured here are a few specialized numbers—to remind you that they, and a number of others, are waiting to be sold and installed on a surely profitable basis, due to their non-competitive character . . . A check of each number will suggest to you the fields for profitable sales. Samples sent gladly for your use in developing the business.

## HART & HEGEMAN DIVISION

THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

# IN THE LIGHT OF T

**J. LIVINGSTON & COMPANY**  
ELECTRICAL CONSTRUCTION  
332 N. MICHIGAN AVENUE  
CHICAGO



June 11, 1934.

Electrical Division,  
Steel and Tubes, Inc.,  
224 E. 131st Street,  
Cleveland, Ohio

Attention: Mr. M. J. Whitfield.

Gentlemen:

We take pleasure in advising you that we have recently completed installation of approximately 100,000 feet of Electrunit Steel tube in the new Ford Motor Company's Century of Progress Exposition Building.

This installation of your material was the first large installation we have made on a job where the material was used in practically all types of construction.

This job was unusual for a building operation of this magnitude, in that the complete installation had to be made in 48 days.

We found it necessary, therefore, to use an unusually large number of journeymen electricians, who we are pleased to advise, very readily took to the use of your new threadless conduit and did a truly remarkable job with it.

We look forward to being able to use a large quantity of your Electrunit Steeltube on future work.

Very truly yours,

J. LIVINGSTON & COMPANY

*Wm. J. Howe*  
Chicago Manager

WmJH/ms

## ELECTRUNITE

REG. U. S. PATENT OFFICE

# THIS EXPERIENCE

## YOU, TOO, SHOULD LEARN MORE ABOUT ELECTRUNITE STEELTUBES

● More than 100,000 feet of ELECTRUNITE STEELTUBES was used in the electrical conduit system of the magnificent Ford Building at Chicago's Century of Progress, designed by Albert Kahn, Inc., Architects, Detroit.

Its use in a building of such importance is a fine tribute to this modern threadless rigid conduit. And the experience of J. Livingston & Company, Contractors, bears out every claim ever made for ELECTRUNITE STEELTUBES—the ease with which it can be installed, because it cuts and bends easily and requires no threading—its adaptability to all types of construction—the facility with which journeymen become adept at installing it.

You, too, should take advantage of the many time and money saving features that ELECTRUNITE STEELTUBES can offer you—a rigid electrical metallic tubing—light in weight, yet affording ample mechanical

ELECTRICALLY



• WELDED •

and electrical protection—knurled inside surface that cuts down cable friction as much as 30%—adapted to any connection by three simple

fittings—and carrying broad Code and Government approval.

Write today for complete descriptive literature and the name of the nearest supply house carrying ELECTRUNITE STEELTUBES in stock.

*Electrical Division*  
**STEEL AND TUBES, INC.**

WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING

CLEVELAND • • • OHIO

A UNIT OF REPUBLIC STEEL CORPORATION

### THE OLD



### THE NEW

*Knurled inside finish available in 1/2", 3/4" and 1" sizes.*

Patent No. 1,962,876



# Steeltubes

# CODE AUTHORITY NEWS

Material for this Department is furnished by The Electrical Contractors' Code Authority headquarters staff.

L. E. Mayer, Chairman,  
569 W. Van Buren St.,  
Chicago, Ill.

E. N. Peak, Vice-Chairman,  
Marshalltown, Iowa

A. J. Hixon  
Boston, Mass.

D. B. Clayton,  
Birmingham, Ala.

L. W. Davis, Executive Officer,  
420 Lexington Ave.,  
New York, N. Y.

J. G. Livingston,  
New York, N. Y.

W. W. Ingalls,  
Miami, Fla.

Lloyd Flatland,  
San Francisco, Cal.

W. A. Ritt,  
Minneapolis, Minn.

R. W. Hodge,  
Kansas City, Mo.

R. L. Jacobs,  
Houston, Texas

## CODE AUTHORITY TO MEET THIS MONTH

A two-day meeting of the Electrical Contractors' Code Authority has been called for August 14 and 15 at the Hotel LaSalle in Chicago.

Chicago was selected for this meeting on these dates because the Construction Planning and Adjustment Board is to meet in Chicago on August 16 and the Construction Code Authority on August 17.

## BID DEPOSITORIES

One hundred and ten Bid Depositories operating in 36 states have been confirmed by the Code Authority and a copy of a list of these bid depositories may be obtained by applying at the headquarters of the Code Authority, 420 Lexington Ave., New York City. Copies of all bids must be filed with the bid depository in the area where the work is located.

## LABOR POSTERS

The Compliance Division of the National Recovery Administration has notified the Code Authority that the official copy of the labor provisions of the Code has been sent to the Government printing office. Due to the tremendous pressure of work in the Government printing office there will be a further delay before official labor posters are ready for distribution. Meanwhile it is most important

that every electrical contractor who has not already done so, send in his request for copies of these labor provisions which must be displayed in every establishment.

## LOCAL ADMINISTRATIVE COMMITTEES

Twelve regional Chairmen and 93 District Chairmen have been appointed by the Code Authority and are operating under its jurisdiction. There are 162 Local Administrative Committees with a total membership of approximately 1000 committee members also operating under the jurisdiction of the Code Authority.

## CODE BLUE EAGLES

The Electrical Contractors Code Authority has begun the distribution of Code Blue Eagles to members of the Industry. These are an evidence of compliance with the Code of Fair Competition for the Electrical Contracting Industry which should be displayed by every member of the Industry. If you have previously received from your local Compliance Director a Blue Eagle poster carrying a different registration number from that given you by the Electrical Contractors Code Authority, you are to discontinue its use and return such poster to the Code Authority to be turned back to the Government. The Code Eagle poster having upon its

face your registration number with the Electrical Contractors Code Authority is the only one which you should display as an electrical contractor.

## CODE ASSESSMENTS

The budget and basis of assessment for the Electrical Contractors Code Authority was approved by the Administration on July 18 to apply from the effective date of the Code, April 30, 1934. Under this approved basis of assessment the Code Authority is authorized to assess all members of the industry 1 per cent of the total productive payrolls for the preceding month or months, excluding operations under contracts entered into prior to April 30, 1934. Members of the industry working with the tools are required to report their time so occupied and the value of their labor the same as for an employee. In accordance with this Administrative Order the Code Authority sent out on July 20 Monthly Assessment and Industry Report forms for the July assessment based on payrolls for May and June.

In addition to this assessment in support of the national, regional and district code administrative agencies, the administrative order also approved the assessment by local administrative committees of 1/10 of 1 per cent upon all contracts amounting to \$250.00 or over undertaken by members of the industry within the jurisdiction of such local administrative committees. Each contractor who is awarded a contract of \$250.00 or over is required to register such contract with the local.

On all contracts for electrical work of \$2,000 and over a certificate of registration must be issued from the Construction Code Authority through the Divisional Code Authority. Under Chapter I of the Code these certificates must be posted on all jobs for construction work or services of or in excess of \$2,000 in value. Duplicate copies of application for registration of such contracts must be sent by the local administrative committee to the Electrical Contractors Code Authority. Hereafter the registration fees due the Construction Code Authority for such contracts will be paid by the Electrical Contractors Code Authority from the assessment of 1 per cent of productive payrolls of all industry members.





**HELP CUSTOMERS  
REDUCE LOSS FROM  
STOPPED  
EMPLOYEES**



Your customers must pay men whether they are busy or "stopped". Unnecessary blowing of fuses on motor circuits causes delays that mean lost production. . . . You can increase your fuse sales by explaining how Jefferson Super-Lag Fuses prevent losses.

Jefferson Super-Lag Renewable Fuses provide reliable, accurate protection—riding over harmless, momentary surges—operating positively on extended, dangerous overloads. There is no better protection for electrical equipment and property—and against payroll loss for STOPPED TIME. There is no better way to increase your fuse sales than pushing Jefferson Super-Lag Renewable Fuses.

Made in all capacities — knife-blade and ferrule types.

JEFFERSON ELECTRIC COMPANY  
Bellwood (Suburb of Chicago) Illinois



The secret of Jefferson Super-Lag performance lies in the lag plate which is a part of the Super-Lag link. This plate retards the normal fuse action, provides a time interval or lag. This time-lag prevents the fuse from blowing on harmless temporary overloads—saves needless shutdowns and link replacements.

**JEFFERSON**  
**Super-Lag** RENEWABLE **FUSES**

# CONTRACTING news

INFORMATION OF INTEREST TO ELECTRICAL CONTRACTORS  
CONSISTING OF ITEMS OF NEWS, SHORT ARTICLES, PRACTICAL  
IDEAS, ETC., OUR READERS ARE INVITED TO CONTRIBUTE TO  
THIS DEPARTMENT



## CHICAGO APPLIES FOR AREA AGREEMENT

The Electrical Contractors' Association of Chicago and Local No. 134 of the International Brotherhood of Electrical Workers have jointly petitioned N.R.A. for an area labor agreement for Cook County. An agreement which, with a few minor exceptions, is the same as that recently signed by the association and the Union in Chicago has been submitted as a suggested agreement. It is expected that the next step will be calling of an open meeting to which will be invited all interested members of the industry in Cook County. As this is one of the first area agreements to be petitioned in the electrical contracting industry it is expected that its procedure will be watched in other cities with considerable interest.

The proposed agreement contains provision for a lower scale for maintenance and repair work than for new work.

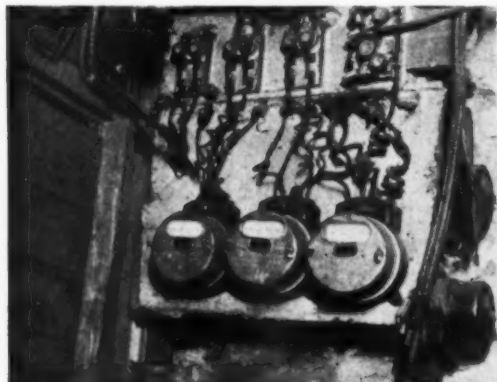
## CLEVELAND ORGANIZED FOR REINSPECTION

After three years of drastic curtailment in inspection work, Cleveland is to have improved service and systematic reinspection through the recent appointment of three deputy inspectors, with two more to come.

Among the first things in this Cleveland campaign, A. J. Pickett, city electrician, plans to organize his men to clear up postponements and uncompleted reports on permits of record. Thereafter a systematic program will be worked out with the preference of risks in the following order: Theatres; other public gathering places; rooming houses and tenements; hazardous industrial occupancies; general commercial structures in downtown fire area, and miscellaneous interim pickups on reported violations.

A tribute is paid by Mr. Pickett to the cooperative spirit of the Cleveland Chapter of N.E.C.A. for their efforts, together with that of the electrical workers, in convincing the city admin-

istration of the need for an increased personnel in the department. It was only after a long period of hard committee work and the presentation of comparative analysis gathered from other cities, that this program could be



**DISCLOSED ON REINSPECTION:** These two horrible examples of wiring were found in Salt Lake City. While they have since been corrected they are indicative of conditions that will be found wherever reinspection is enforced.

# **YESTERDAY! TODAY! TOMORROW!**



## **Knob and Tube Wiring Stands the Test**

The Westinghouse "Home of Tomorrow" at Mansfield, Ohio, used the Knob and Tube system in the installation of approximately 23,000 feet of various sizes of wire.

Outstanding evidence that the system which was first to receive official approval of Inspection Bureaus and Underwriters' Laboratories offers still today the utmost in

**Safety—  
Economy—  
Permanence—**



Other wiring methods come and go, rise and fall, only to leave the Knob and Tube system unchallenged in all-round efficiency.

We, as manufacturers of these porcelain materials, hail the Westinghouse "Home of Tomorrow" as a monument to the vision and foresight of its sponsors.

**Porcelain Products, Inc.,  
Parkersburg, W. Va.**

*Sales Offices in all principal cities.*



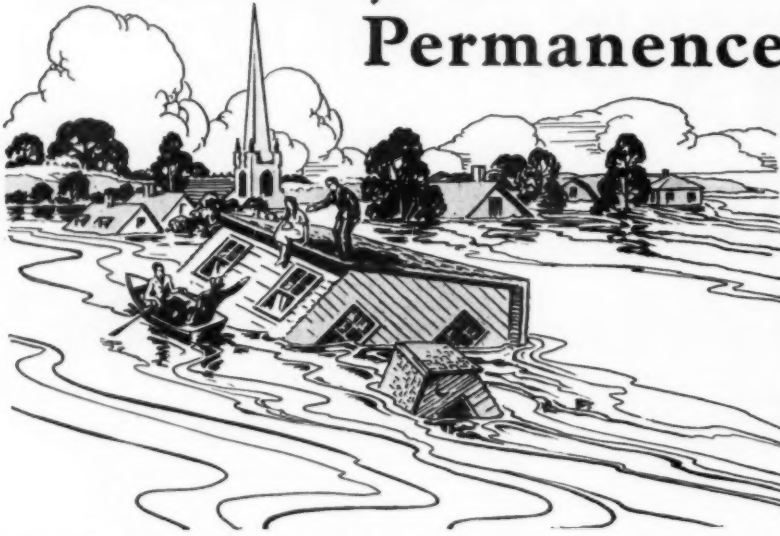
Findlay, Ohio  
Carey, Ohio

FACTORIES AT

Parkersburg, W. Va.  
Ravenswood, W. Va.



# The Enemy of Permanence



**M**AN has been resisting the destructive forces of nature since the beginning of time. It is the one great enemy of permanence. Attaining durability in Friction Tape has been a noteworthy achievement of DUTCH BRAND chemists. Today you can get in DUTCH BRAND Tape, a product capable of lasting for years . . . under all kinds of conditions. That's why so many contractors have said, "Tape jobs must stand up, so we use DUTCH BRAND exclusively."

The Tape you use will last longer if it is DUTCH BRAND. Why not buy permanence then, instead of paying the extra cost of retaping or jeopardizing an important job by the use of a few cents' worth of poor tape.

DUTCH BRAND Friction Tape, Rubber Tape and Soldering Paste are sold by electrical jobbers everywhere.

**VAN CLEEF BROS.** Est. 1910

Manufacturers Friction and Rubber Tape and Soldering Paste  
Woodlawn Ave., 77th to 78th Streets, Chicago, U. S. A.

**DUTCH BRAND  
SOLDERING  
PASTE**

Scientific mixture—non-corrosive. Cleans as it works. Holds solder fast. Less paste required per job.

**THE JUMBO PACKAGE**  
Contains 10 standard No. 8 rolls. The economical way for repairmen, electrical contractors and industrial users to purchase Friction Tape, where individually cartoned Tape is not required.



This Dispenser will increase your retail sales over 100%. It will sell Tape to people who had no intention of buying.

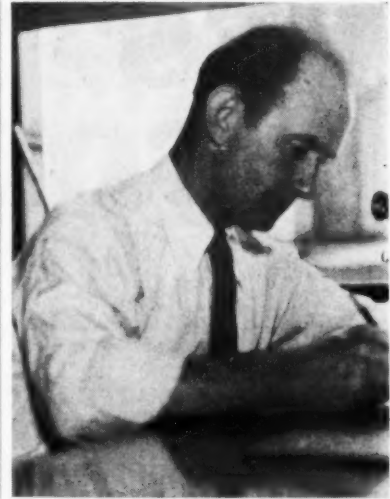


**DUTCH BRAND  
RUBBER INSULATING  
TAPE**

Fuses instantly without heat. Molds into one solid piece. It stretches without breaking because it contains more live, new rubber.



See the DUTCH BRAND EXHIBIT at A CENTURY of PROGRESS-CHICAGO-1934



A. J. Pickett

made effective. Then only after showing satisfactory proof that such budget increases as this program incurred would become self-sustaining.

## MINNESOTA CONTRACTORS HOLD SUMMER MEETING

The Minnesota Electrical Association held its seventh annual summer meeting at Breezy Point Lodge near Brainerd, Minn., July 15 and 16.

All sessions of the convention were open to all members of the industry. Among the speakers at the convention were William A. Ritt, member of the Electrical Contractors Code Authority who spoke on "The Electrical Contracting Code"; Guy Basom, superintendent, Fairmont, Minn., who spoke on "Merchandising and Load Building from the Municipal Viewpoint"; William G. Hazel, president, Henderson-Hazel Corporation, Cleveland, Ohio, on "Overhead in the Electrical Contracting Business." In addition to the speakers listed above, L. E. Mayer, chairman of the Electrical Contractors Code Authority, attended the meeting representing both the Code Authority and the N.E.C.A.

A round table discussion was led by the regional and district chairman for the Electrical Contractors Code Authority regarding the electrical contractors code administration, as well as a discussion on modern merchandising for contractor-dealers.

Monday evening was devoted to a banquet with entertainment. Louis H. Gordon was toastmaster.



# ANNOUNCING

*new*  
**P&S**

## WIRING DEVICES

● In originating and developing the P&S-Despard Line of interchangeable wiring devices—Pass & Seymour has pioneered one of the greatest advancements in the history of the wiring device industry.

● Ever alert to the needs of users, and closely co-operating with our distributors to better serve them on their varying requirements we are now releasing to the trade the following New P&S Wiring Devices:

- • • Surface Tumbler Switches with bakelite covers—in both Six and Ten Ampere types.
- • • A line of ceiling pull switches including 3 circuit types for controlling 3 light lamps.
- • • Range receptacles—both surface and flush types—with all the necessary accessories for installation including armored and all rubber cord sets.
- • • Multi-gang bakelite wall plates with P&S-Despard face design.
- Write for descriptive data sheet giving full information on these new devices.

**PASS & SEYMOUR, INC.**

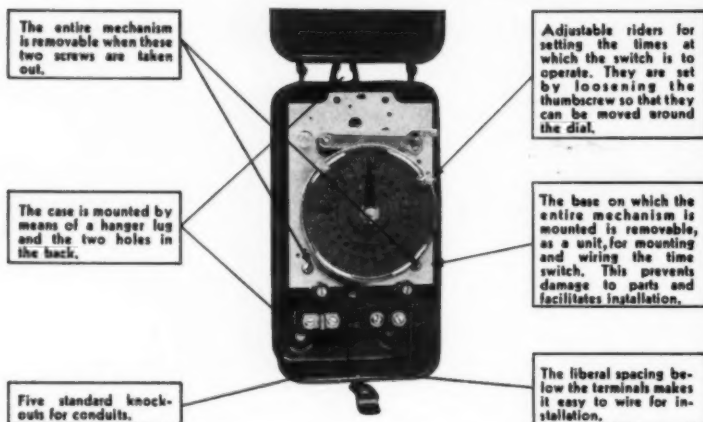
Solvay Station

SYRACUSE, N. Y.



## GET YOUR SHARE OF THIS PROFITABLE BUSINESS

### See How EASY It Is to Wire G-E Time Switches



**T**HE mechanism of G-E time switches is easy to get at. Their readily accessible terminal board and their convenient knockouts make wiring an unusually simple job. Eliminate your wiring worries, and at the same time increase your profits on each job, by installing G-E time switches.

G-E time switches eliminate expensive service calls to wind clocks, set time, lubricate bearings, and free sticky contacts—jobs for which no profitable entry appears in the ledger. They are more than just another “fitting.” They are a profitable part of any wiring job, and in many cases will bring you repeat orders and new business because of their reliable operation.

Start cashing in on the profitable business they offer, by ordering one of these switches now.

**YOU CAN WIRE THEM AND FORGET THEM**

# GENERAL ELECTRIC

**L**ET us tell you more about G-E time switches and auto-transformers. Simply mail the attached coupon or address the nearest G-E sales office, the G-E Supply Corporation, or the Graybar Electric Company, Incorporated.

General Electric Company  
Dept. 6J-201, Schenectady, N. Y.

Gentlemen:

Please send me descriptive and application data on the products I have checked above.

Name \_\_\_\_\_

Firm \_\_\_\_\_

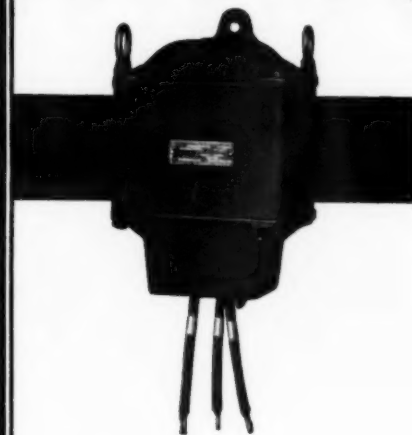
Street \_\_\_\_\_

City \_\_\_\_\_

Time Switches ☐ Air-cooled Transformers ☐

State \_\_\_\_\_

440-44

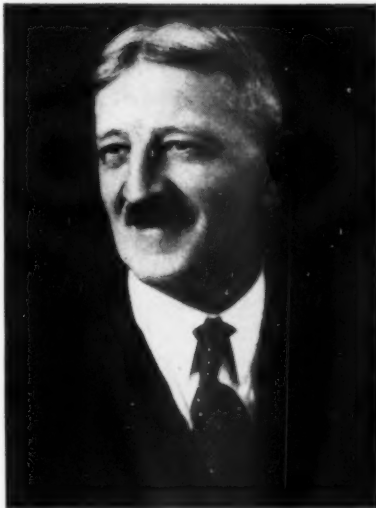


### Provide The Right Voltage with G-E Auto-transformers

**I**N order that they may give the most satisfactory service, motors and other electric apparatus must be operated at the voltage for which they are designed.

Wherever supply voltage is lower or higher than the rated voltage of equipment, you will find profitable business installing G-E auto-transformers for boosting or lowering your customer's supply voltage.

These transformers improve the operation of single- or three-phase electric equipment at a surprisingly low cost. You will find that industrial plants will welcome your suggestions.



**CHAIRMAN CODE REGION No. 11:** S. G. Hepler, owner of Arrow Electric Co., Seattle, Wash., which was established in 1907, is chairman of the Code Region No. 11 which takes in Washington, Oregon, Idaho, most of Montana and Northwestern Wyoming. His company, while it has engaged in all forms of electrical construction, has for the last few years confined its operations to heavy general building installations. He is a past president of both the Seattle and the State electrical contractors associations as well as of The Seattle Electric Club, while for the past four years he has been chairman of the legislative committee of the Seattle Electrical Contractors Association and of The Seattle Electric Club.

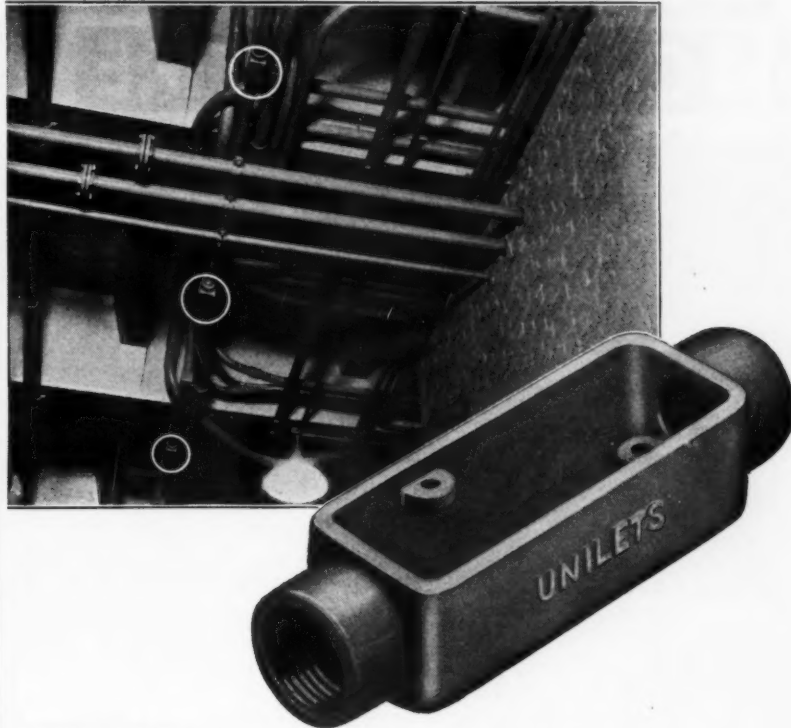
#### LIST OF INSPECTED APPLIANCES AVAILABLE

Underwriters' Laboratories, 207 E. Ohio St., Chicago, has now available for distribution the May 1934 list of inspected electrical appliances which supersedes the previous list.

#### POWELL HEADS ILLUMINATING ENGINEERING SOCIETY

A. L. Powell, manager of the eastern office of the Nela Park Engineering Department of General Electric Company, has been elected president of the Illuminating Engineering Society for the year 1934-1935, succeeding J. L. Stair, chief engineer of Curtis Lighting, Inc., Chicago.

Other officers elected by the I.E.S. are L. A. S. Wood, manager of the lighting department of Westinghouse Electric & Mfg. Co., vice-president; G. Bertram Regar, head of the lighting sales department of the Philadelphia Electric Co., vice-president; D. W. Atwater, Westinghouse Lamp



## WHERE LONG WEAR COUNTS USE . . . APPLETON MALLEABLE UNILETS

● In the steam room of a prominent public service company, an important requirement of the electrical installation was that long life be assured.

Appleton Threaded Malleable Unilets were used because the cadmium finish resists rust and corrosion, and the malleable iron gives greater strength, yet less weight.

Where long wear counts, use Appleton Threaded Malleable Unilets.

*Sold through Jobbers*

#### APPLETON ELECTRIC COMPANY

1704 Wellington Ave. - Chicago, U. S. A.

New York—180 Varick St. Los Angeles—340 Azusa St.

San Francisco—655 Minna St.

St. Louis—420 Frisco Bldg. Detroit—7724 Woodward Ave.

Philadelphia—530 Arch St.

## APPLETON

### Threaded Malleable

*Standard for Better Wiring*

## UNILETS

Reg. U. S. Pat. Off.



TYPE "C"  
Malleable Unilet with Cadmium Finish



TYPE "E"  
Malleable Unilet with Cadmium Finish



TYPE "LB"  
Malleable Unilet with Cadmium Finish



TYPE "T"  
Malleable Unilet with Cadmium Finish



## CRESCENT WIRE IN THESE BUILDINGS...

DEPARTMENT OF AGRICULTURE EXTENSIBLE BUILDING  
WASHINGTON, D. C.



Supervising Architect—James A. Wetmore, Washington, D. C. General Contractors—Aronberg-Fried Co., Inc., New York, N. Y. Electrical Contractors—Fischbach & Moore, Inc., New York, N. Y.



... IS LASTING EVIDENCE  
OF RECOGNIZED QUALITY

CHICAGO POST OFFICE, CHICAGO, ILLINOIS



Architects—Anderson, Probst & White, Chicago, Ill. General Contractor—John Griffiths & Son, Chicago, Ill. Electrical Contractor—A. S. Schulman Elec. Co., Chicago, Ill.

### CRESCENT PRODUCTS



"Crescent" Safecote National Electric Code Rubber Covered Wire and Cable.

Safecote Intermediate Grade Rubber Covered Wire and Cable.

Safecote "Imperial" 30% Rubber Covered Wire and Cable.

"Crescent" Lead Encased Wire and Cable.

"Crescent" A.B.C. Armored Cable.

"Crescent" Lead Covered Armored Cable.

"Cresflex" Non-metallic Sheathed Cable.

"Crescent" Flexible Metallic Conduit.

"Crescent" Varnished Cambric Cable.

Lead Encased or Braided.

"Crescent" Parkway Cables.

All kinds of Special Wires and Cables

"Forty-Five Years of Knowing How"

## CRESCENT

INSULATED WIRE & CABLE CO. INC.

TRENTON, NEW JERSEY

Company, general secretary, and W. F. Little, Electrical Testing Laboratories, New York City, treasurer.

### CHESTER PEACOCK

Chester Peacock, service engineer for Underwriters' Laboratories, New York City, was drowned on June 29 at Lake Mohawk, N. J.

In his capacity as service engineer for the past eight years, Mr. Peacock traveled throughout the eastern states, contacting municipal, electrical and fire department officials, and with various other inspection authorities. He was particularly active in the Eastern Section of the International Association of Electrical Inspectors and at various times was in charge of groups traveling by special train to meetings of this association, and also of the National Fire Protection Association.

### GEORGE W. MALONE

George W. Malone, one of the old-time electrical contractors of Cleveland, Ohio, died on July 10.

He was one of the early members of the National Electrical Contractors Association and had the reputation for being an industrious worker in local industry association matters.



### INTERESTING CLEVELAND CONTRACTING OFFICE:

The above imposing structure is occupied by the Martien Electric Co., 5601 Carnegie, Cleveland, Ohio. This firm has specialized in large construction work since 1906. Ample space along the street frontage affords pleasant quarters for their office organization, while the rear portion and basement house stock-rooms, tool racks and heavy job equipment. Designed originally for use by the telephone company, this building has been occupied for ten years by this well-known electrical contracting firm as headquarters in performing many large Cleveland projects, such as Lakeside Hospital, Public Library, Allerton Hotel and general industrial work. No motor repair shop is operated by the firm. H. L. Martien, president and treasurer, is active in local industry affairs.

# CUTLER HAMMER Safety Switches

## Too Good for Safety Switches?

Because Cutler-Hammer has meant Motor Control Leadership for 40 years throughout industry, Cutler-Hammer has but one manufacturing standard, and today builds Safety Switches with the same care and around the same designs as C-H heavy duty industrial controls.

This has led to the remark that such construction is needlessly good—too good for this less exacting service.

But since this policy is agreeable to C-H, and since all prices are the same, why argue the matter? . . . A little study of the C-H Safety Switch Line reveals the values in that policy: By these methods of manufacture C-H assures complete user satisfaction, and offers sellers the greatest of opportunities for prestige and profit.

Alert independent wholesalers stock the complete Cutler-Hammer Safety Switch Line. CUTLER-HAMMER, Inc., *Pioneer Manufacturers of Electric Control Apparatus*, 1306 St. Paul Ave., Milwaukee, Wis.

• • •  
Cutler-Hammer Meter Service Switches, of types approved in most localities, are built to the same standards as C-H Safety Switches. Ask for Catalog.

# CUTLER HAMMER



*The Ace of Safety Switches.* Bull. 4101 Mill Duty Current Breaker, Type A. Quick make, quick break, single throw, interlocked safety cover. Handles excessive overloads with practically no arcing. Double break air-blanketed contactors, non-current carrying hinges, unit base construction preventing electrical creepage—has added reserve capacity for heavy overloads. 30 to 600 amps., 230 to 600 volts, 2, 3 or 4 pole, fusible and non-fusible.



# GREENLEE

## ANNOUNCES AN IMPROVED Conduit Bender



Bending rigid conduit with a Greenlee. These Benders are convenient to operate and require very little effort, even for bending the larger sizes.

No radical changes have been made in Greenlee Hydraulic Conduit Benders. But they have been improved in several respects. For one thing, the new device for returning the ram provides for quicker and more convenient bending. Then, the improved shape of the body and the addition of a handle for carrying make them easier to move about. Changes have been made, too, so that the working parts are easier to get at, should it be necessary to service them at any time.

But regardless of improvements or of any statement that might be made about the possible savings with a Greenlee Bender, the important facts are that they bend conduit quicker and better than by any other method; that they eliminate the need of many costly fittings; and that they make it easier to pull in wire and cable.

If you are acquainted with Greenlee Benders, you will now want to know more about these improvements. If you haven't investigated them, it is time you learned about these splendid tools. Just use the handy coupon provided below. No obligation, of course.



Greenlee Rigid Conduit Bender. Built in two sizes for bending from 1 1/4" to 3" conduit and from 2 1/2" to 4 1/2" conduit.

Greenlee Conduit Bender with attachments for bending thin-wall steel conduit in sizes from 1 1/4" to 2".



**Greenlee**  
TOOL CO. GREENLEE U.S.A.  
ROCKFORD, ILLINOIS, U.S.A.

-----Mail This Coupon To-day-----  
GREENLEE TOOL CO., ROCKFORD, ILL. Date \_\_\_\_\_  
Please send information on your improved Conduit Benders.  
Name \_\_\_\_\_ Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_  
My Jobber is \_\_\_\_\_ 8-34

## A ROLL O' TAPE

ELECTRICAL FLASHES  
GATHERED AMONG THE  
BIG WIRE AND PIPE MEN

BY

ELECTRICAL CONTRACTING'S  
FIELD EDITORS

ALL rural, village and town wiring served by the Tennessee Valley Authority electrification development is to be inspected by Authority field men for compliance with current editions of the National Electrical Code, according to recent bulletins issued in the valley. Several communities have also established municipal inspection departments.

PERMIT fees collected by Chicago's Bureau of Electrical Inspection for the first half of 1934, exceed by \$25,000 the receipts for the same period in 1933.

C. J. STAFF of Milwaukee was awarded a \$26,000 job because he happened to be just four dollars lower than his nearest competitor.

PRACTICAL Hobbies—Will E. Evans, Evans Electrical Construction Company, Kansas City, Mo., knows his camera. Their large industrial jobs present many interesting camera shots, and "Bill" takes them well. Good advertising—saves commercial photo costs—records useful ideas for the next job.

EVEN with the handicap of no field men and no Red Seal advertising 30 out of the 42 homes (71%) built in Kansas City, Mo., in the first five months of this year were wired to Red Seal standards.

THIS spring the Wire Division of the Boston Fire Department, through its superintendent, Peter F. Dolan, made a radio appeal to the public for cooperation to help it reduce the number of fires due to electrical causes. This is the second broadcast of this nature made by the Boston inspection department. Among other things Mr. Dolan urged



# New BRYANT DEVICES

*for new applications*

CAREFULLY ENGINEERED TO THE NEED



A new clock hanger receptacle with space for storage of cord. No cover plate needed. Catalog Number 2828.

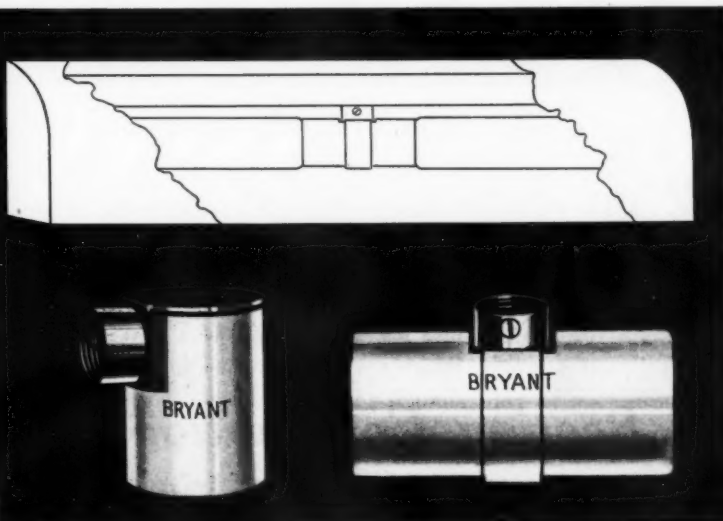
Round Appleton 4 inch cover for single pole sentinel breakers. Catalog Number 8705.

Square Appleton 4 inch cover for double pole sentinel breakers. Catalog Number 8706.

THE BRYANT NAME *guarantees*  
SUPERIOR CONSTRUCTION

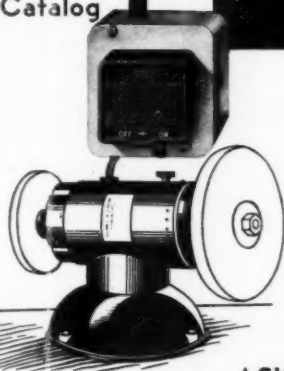
THERE IS A REAL NEED FOR THESE NEW BRYANT DEVICES.

THEY ARE ACCURATELY MADE FOR THE NEED.  
GET YOUR SHARE OF THE VOLUME!



## PORCELAIN COVE AND TROUGH LIGHTING SOCKETS

ANGLE TYPE— $\frac{1}{8}$  INCH, No. 7043;  $\frac{3}{8}$  INCH, No. 7044  
TWIN TYPE — $\frac{1}{8}$  INCH, No. 76750;  $\frac{3}{8}$  INCH, No. 76751



FOR FURTHER  
INFORMATION  
ASK FOR CATALOG  
PAGE 112E



# BRYANT

*Superior Wiring Devices*

Manufactured by THE BRYANT ELECTRIC CO., Bridgeport, Conn.

MANUFACTURERS OF "SUPERIOR WIRING DEVICES" SINCE 1888 . . . MANUFACTURERS OF HEMCO PRODUCTS

NEW YORK 60 East 42nd Street . . . CHICAGO 844 West Adams Street . . . SAN FRANCISCO 149 New Montgomery Street

## WIREMOLD MIDGET



(Cross sections of MIDGET showing capacity)

**"Another great thing about Midget" writes a contractor "is that the fittings are so simple, so practical and so adaptable to all conditions!"**

A typical comment selected from hundreds sent us by contractors.

You can't fool contractors on Midget—for it has all the well-known Wiremold features—all its versatility. Wiremold perfection—on a smaller scale.



**THE WIREMOLD COMPANY, Hartford, Connecticut**

### *Beating Competition with Brains*

Competition is tough in the electrical contracting business these days; and every day it gets worse. Successful contractors have found they can beat fly-by-night competition best by using their brains, and by educating their responsible employees. You can help your head men to keep abreast of the times and save you money by sending each his own copy of **ELECTRICAL CONTRACTING**.

the public not to "engage the services of handy-men or amateur electricians. These men usually leave your service worse than they find it. Send for and accept the services of licensed electricians only."

**E**XACTLY one hour elapses in the complete color cycle of the mobile lighting system of the Century of Progress Ford Exhibit.

**A** MONTHLY house-organ of the newspaper type was started in June by The Maintenance Company, industrial electrical contractors of New York. Different forms of the company's service, particularly maintenance, are detailed and customer experiences related.

**D**URING the past six years 147 fires have been caused by static electricity according to the records of the Associated Factory Mutual Fire Insurance Companies. The majority of these fires occurred during the heating months when the relative humidity indoors is low. Ample ventilation, grounding, artificial humidification and static neutralizers have been used to keep the number of fires due to static electricity down to 1.5 percent of all fires reported.

**O**RVAL POEHLMAN, Milwaukee contractor, recently sold an electric range to replace one installed by his father over twenty years ago. Ranges and water heaters are his specialty. On account of the low power rate given industrial plants he has been able to install water heaters in several of them so that showers could be available for the men.

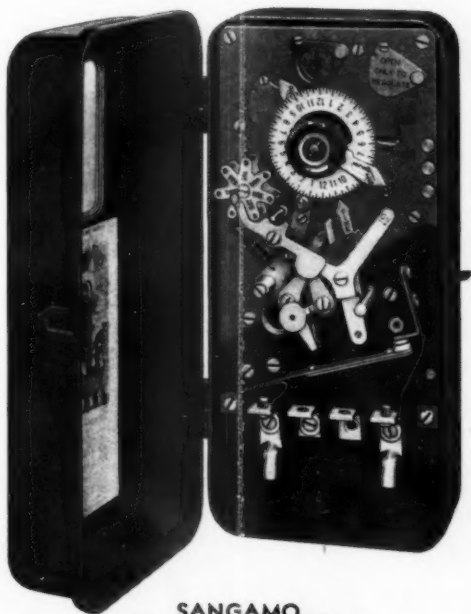
**I**NSPECTION fee revenues are looking up with the New York Board of Fire Underwriters. After experiencing deficits for three successive years, their revenues have now increased to equal their cost of operations.

**"JACK" SQUIRE**, well known Kansas City contractor has talked before more than 50 organizations within the last three years on industry matters. "Things you ought to know"—dealing with elementary science as related to electricity and illumination is his most popular subject, and has been given before civic and commercial clubs, high school groups, university classes throughout the adjacent trade territory.

**C**ONTRACTORS in Milwaukee who sell and install ranges benefited through the formation of an association last fall. As a result satisfactory discounts have been arranged for those who fall under the following classification: 1. Have three or more ranges on



*There is no*  
**MYSTERY**  
*to*  
**SANGAMO**  
*efficiency*



SANGAMO  
 FORM VW TIME SWITCH  
 ELECTRICALLY WOUND—10 HOUR RESERVE

SANGAMO Time-Switch efficiency is not mysterious—rather it is the result of more than 30 years' experience in the manufacture of precision instruments.

Time-Switches are precision instruments—they should be treated as such—SANGAMO does—That's why SANGAMOS operate so accurately and for so long a time without costly service calls.

Be sure of the best in time-switches—insist that your next time-switch is a SANGAMO. You'll find a SANGAMO wholesaler in every distribution center.

SANGAMO ELECTRIC COMPANY  
 SPRINGFIELD, ILLINOIS

*Manufacturers of*

**SANGAMO**  
*Precision* **TIME - SWITCHES**

### Look on the Inside

Study the mechanism—notice how compact and sturdy—you'll realize then why the SANGAMO Time-Switch always does the job as you insist it be done.

All SANGAMO Time-Switches are precision made for precise jobs.



**INSURE your PROFITS and please your clients**  
 . . by the installation of Kliegl lighting specialties. Modern in every respect, approved by Underwriters, easily installed. Dependable products, priced right, and unsurpassed for practical utility. Used by world's foremost theatres, schools, hotels, community centers, auditoriums, and other leading establishments.

*modern* **STAGE LIGHTING equipment**

Let us help you get the best results at the lowest cost by checking your plans and making recommendations.

We manufacture all forms of lighting equipment for recreational purposes—for theatricals, athletic events, swimming pools, playgrounds, pageants, bathing beaches, etc.

Write for a copy of our Complete Catalog

**KLIEGL BROS**  
 UNIVERSAL ELECTRIC STAGE LIGHTING CO., INC.  
*Theatrical · Decorative · Spectacular · Lighting*  
 321 West 50th Street • New York, N. Y.



## All Electric TORK Time Switch Refills

For nearly 15 years Tork Clocks have been the standard of the trade.

During that time thousands of the old style non-electric models were sold. These are now ready to be modernized with a TORK All-Electric Refill—No. 515, All-Electric unit, is made to mount in the old case *without disturbing connections*—See how simple it looks!

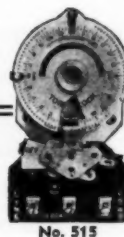
TORK Clocks are made for all kinds of automatic switching, any capacity, any timing cycle—Will skip certain days if desirable—Free wheeling dial and complete freedom of hand operation.

*High-grade Hand-Wound types available for service on D. C. Ask for Bulletin No. 421-T.*

**THE TORK CLOCK COMPANY, INC.**

MOUNT VERNON

NEW YORK



display at their place of business, which is located on a business street. 2. Have a person capable of closing contracts outside and on the floor of the place of business at all times during business hours.

THIS summer the McGraw-Hill Book Company is celebrating its twenty-fifth anniversary in the publishing business. In a quarter of a century this company has grown to be one of the leading producers of technical books and especially so in the field of electricity.

THE National Fire Protection Association has appointed a committee of five to make recommendations for control of hazards of primary electric service installations.

TEN THOUSAND persons—(architects, builders, students, laymen)—were conducted through the Lighting Bureau at Kansas City, Mo., during the first year. Area about 5,000 sq. ft.—over 300 controlled circuits—connected load over 100 KW—more than 300 types of typical lighting units and devices—limited to fundamentals of illumination.

IN our June issue it was stated that Earle N. Peak, vice-chairman of the Electrical Contractors' Code Authority, was a former president of the Iowa Association of Electrical Contractor-Dealers. We are informed by M. J. Frazer, secretary, that Mr. Peak was re-elected president of the Iowa Association over a year ago and still holds that office.



**INSTALLS LARGE TRAVELING OVEN:** James E. Rust, Chicago contractor of 28 years' experience, recently completed the electrical work on one of the world's largest traveling ovens, and air conditioning in a local bakery. Scientific study of correct temperatures, not only in baking, but in cooling, has improved the flavor of food and increased business for the electrical contractor.

# Have you sent in your card???

If not please DO IT NOW!!

*Tear  
Out  
and  
Mail*

Please fill in and return for your listing in  
CLASSIFIED LIST OF ELECTRICAL CONTRACTORS

1. Are you still doing electrical contracting work? ☐ Yes. ☐ No.
2. If so, please tell us which of the following kinds of wiring you do, and then underline the one you specialize in:  
☐ Residential ☐ Commercial ☐ Industrial ☐ Motor Repairs
3. In which of these six groups would your 1934 wiring business fall?  
☐ Under \$5,000 ☐ \$5,000 to \$10,000 ☐ \$10,000 to \$20,000  
☐ \$20,000 to \$50,000 ☐ \$50,000 to \$100,000 ☐ Over \$100,000
4. Do you employ wiremen? ☐ Yes. ☐ No.  
If so, how many on the average? .....
5. Do you conduct your business from ☐ A Store ☐ Office ☐ Your Home?
6. How long have you been an electrical contractor? .....

Name .....

Address .....

City and State .....

Return to Electrical Contracting, 520 No. Michigan Ave., Chicago, Ill.



For

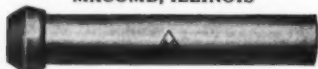
### Residence Wiring

The Best and Safest Method is a properly installed KNOB and TUBE job. Be sure and get the

**Bull Dog**  
REGISTERED

Assembled Knob because it "HAS A GRIP LIKE ITS NAMESAKE."

ILLINOIS ELECTRIC PORCELAIN CO.  
MACOMB, ILLINOIS



A MARK OF QUALITY

True to name Kwikon Fittings are quickly and easily applied. Their use insures labor savings on every job.

### "The Line of No Regrets"

KWIKON Locknuts and Bushings  
KWIKON Box Connectors  
KWIKON Conduit Straps  
KWIKON Conduit Clamps  
KWIKON "No-Bolt" Studs  
KWIKON Fixture Studs  
KWIKON Ground Clamps  
KWIKON Conduit Nipples  
KWIKON Outlet Box Clamps  
KWIKON Ground Fittings  
KWIKON Conduit Plugs  
KWIKON Fixture Nuts  
KWIKON Fixture Hickeys  
KWIKON Steel Extensions  
KWIKON Conduit Fittings  
KWIKON Fixture Hanging Devices  
KWIKON Conduit Hanging Devices

**KWIKON COMPANY**

626 W. Jackson Blvd., Chicago, Ill.

# NEWS MANUFACTURERS

A DEPARTMENT FOR THE ANNOUNCEMENT OF ACTIVITIES OF MANUFACTURERS THAT ARE OF INTEREST TO CONTRACTORS, SUCH AS CHANGES IN EXECUTIVE PERSONNEL, BRANCH OFFICES, NEW PRODUCTS, ETC.

### BARRY GENERAL SALES MANAGER OF ARROW-HART & HEGEMAN

The Arrow-Hart & Hegeman Electric Company, Hartford, Conn., announces the appointment of Grosvenor C. Barry general sales manager, filling the vacancy caused by the death of Harvey C. Pond.



G. M. Barry

For the past six years, Mr. Barry has been connected with the company as export manager and industrial sales manager, later being appointed assistant general sales manager.

Mr. Barry joined the Western Electric Company in the jobbing division in 1912, and from 1914 to 1918 he was associated with the Hart Manufacturing Company. When the American Brown Boveri Company was organized in 1926, he joined the firm as assistant vice president, but resigned in 1928 to become associated with The Arrow-Hart & Hegeman Electric Company.

General Electric Co., Schenectady, N. Y., has published an 80-page reference book on "How to Select Insulated Cable" designated as GE-1837. The publication covers cable for the transmission and distribution

of electric power at normal frequencies and presents in convenient form the information required in determining the cable best adapted for a particular installation.

The book also covers application of cable, tables on current-carrying capacities, two methods of selecting conductor size, descriptions of various types of insulation and finish, and tables of thickness are given. Tables of wire gauges and dimensions, size of shipping reels and general information and data are also contained in the book.

### KWIKON APPOINTS NEW AGENTS

The Kwikon Company, 626 West Jackson Blvd., Chicago, Ill., has appointed the following as agents for Kwikon products:

James J. Slater, 186 Purchase St., Boston, Mass.; Elenbe Sales Co., 250 No. 11th St., Philadelphia, Pa., and Noad & Nicholas, 377 Brannan St., San Francisco, Calif.

Steel City Electric Co., Pittsburgh, Pa., announces the appointment of Electrical Sales & Engineering Co., 227 S. Green St., Chicago, as its sales representatives in the Chicago territory.

A bound set of engineering data sheets on Transite electrical conduit has been published by Johns-Manville, New York City. The book includes a discussion of the properties of Transite conduit, information on sizes, weights and list prices, details and dimensions of fittings, description of installation methods and a specification for the material.

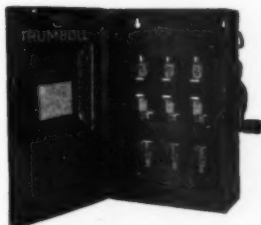


# "R.B." FRONT OPERATED SAFETY SWITCHES SAVE SPACE

**Equipped with Vystipe Fuse Clamps—Grip Like a Vise**



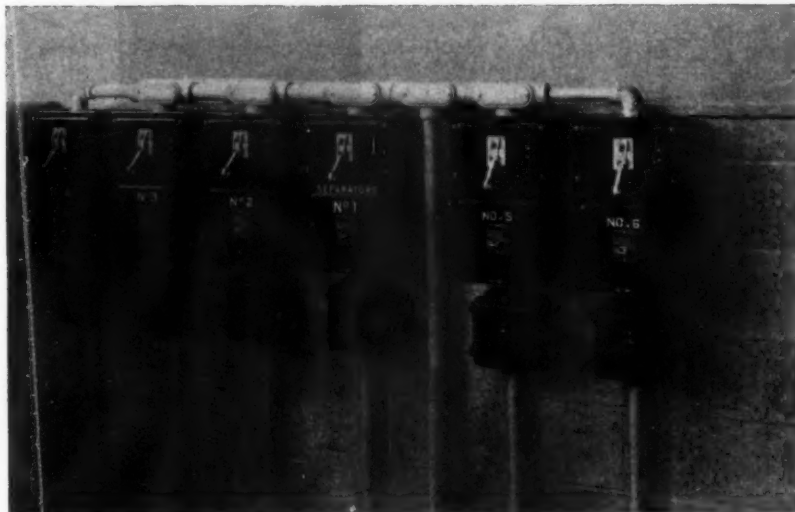
Vystipe Fuse Clamp  
Cartridge Type—For 30  
and 60 amp. Switches



Side Operated "R. B."

The "R.B." line, both front and side-operated, is available for the following specifications:

30—800 amps.  
230—575 V.A.C.  
250—600 V.D.C.  
Single Throw.  
No-fuse and Fusible.  
2, 3 and 4 Pole.  
Break full rated load.  
Interlocking cover.  
Quick-make & Quick-break.  
Rated in H.P.  
S.N. and S.W.N.  
Water-tight and Dust-tight  
Cast Iron Boxes for side-operated type only.



*Trumbull Front Operated "R. B." Safety Switches  
controlling six power circuits in a large brewery*

Contractors are constantly increasing their business in Industrial Plants. They are depended upon more and more for engineering layout as well as actual installation work.

There are many jobs requiring close ganging in Industrial distribution centers where front-operated "R. B." Switches simplify conduit connections and solve the layout problem.

Switch handle end is drilled for pole-hook operation, permitting installation in high locations which are ordinarily inaccessible for switch mounting.

In addition to ability to break current and stand mechanical abuse, the entire fusible "R. B." line—both front and side-operated—is equipped with "Vystipe" Fuse Clamps. These clamps force a definite full fuse contact under pressure and reduce heating of fuse terminals more than 50% over fuse clips.

Consider this line in your next power and lighting job—whether in an Industrial Plant or commercial building.

*Write for complete description and listing.*

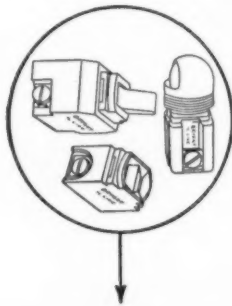
**THE TRUMBULL ELECTRIC MFG. CO.**  
Plainville, Conn.

A GENERAL ELECTRIC ORGANIZATION

# August New Products

## Interchangeable Wiring Devices

A new interchangeable list of wiring devices announced by Bryant Electric Co., Bridgeport, Conn., is called their "IL" line. These compact devices permit three units to fit a single



gang space and offer a very wide range of combinations at a reduced stock investment. A new triplex convenience outlet in brown Templus is included as a complete item, in addition to four types of enclosed flush tumbler switches, also available in locking type. Four receptacle bodies, miscellaneous accessories and brown Templus or brush brass plates complete this line. The manufacturer announces that fittings manufacturers have designed covers for this interchangeable line of devices, thus adapting their use for exposed commercial or industrial work, as well as flush type gang boxes.

## Cord Connector

A new locking connector body and flush receptacle has been announced by the Merchandise Department of the General Electric Co., Bridgeport, Conn. Made of black Textolite, the connector is designed for appliances in which a power cord cannot come out when pulled—it is locked in place. It may be removed only by turning it a short distance to the left.

## Photoelectric Relay

G-M Laboratories, Inc., Chicago, announces a photoelectric relay which will operate on changes in illumination as small as 1 ft. candle or less, and when used in conjunction with the G-M No. 1217 light source can be operated at distances as great as 90 ft. with white light and up to 40 ft. with an infra-red invisible beam. Relay operates on 110 volt, 60 cycle, a.c. and is normally supplied with contacts having 2 amps., a.c. non-inductive load capacity. Manufacturer states that a speed of 600 operations per minute can be consistently maintained,

and circuit can be so arranged that no plate current is drawn from amplifier tube except while the light beam is interrupted.



## Lock Type Switch

A flush type lock switch No. 1311-L in the compact Despard wiring device line is announced by Pass & Seymour, Inc., Syracuse, N. Y. A small key No. 1499 is furnished with each switch. Single pole, double pole, three-way and four-way types are furnished, of the same mechanism as regular line.

## Across-the-Line Motor Starter

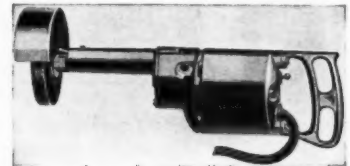
Designed for motors up to 15 hp., 220 volt, and 30 hp., 440-550 volts, The Electric Controller & Mfg. Co., Cleveland, Ohio, announce the type ZO, weather-proof and dust-tight across-the-



line, oil-immersed motor starter. Starters are enclosed in a case which has been bonderized and then black enameled. When desired, a self-contained ammeter in a dust-tight case can also be furnished. Starter is arranged for remote control, push button automatic operation.

## Electric Grinder

A portable light duty electric grinder that can be taken to the job is announced by Signal Electric Mfg. Co., Menominee, Mich. Body and handle being of cast aluminum, this limits net weight to 9 lbs. Its universal motor is for d.c. or a.c., 110 volts, 25 to 60 cycles, with a no load speed of 3400 R.P.M., rated 1.5 amp. A positive



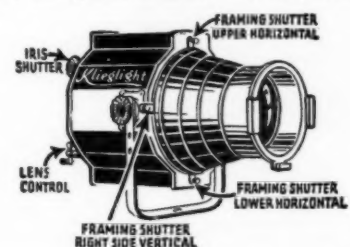
"make and break" toggle switch is provided, also 8 ft. of heavy duty rubber covered cord and rubber plug.

## Cable Pulling Compound

Cable pulling compound for pulling cable through underground conduit has been placed on the market by B. S. Barnard & Co., New York City. Manufacturer states that compound contains nothing injurious to the cable sheathing or conduit and that it stays with the cable and will not dry out over a period of years.

## Projector

A new spot-and-flood projector instantly adjustable to any desired light beam pattern, round, square, rectangular, triangular, semi-circular, etc., is announced by Kliegl Bros., New York City.



Greater efficiency, with uniform field, on wide range of beam control are claimed for this new item. Intensity of light is variable by adjustment of lens system, without employing a dimmer, and has a range up to 250 ft. for interior or outdoor spot-lighting or flood-lighting. Ease of adjustment, current economy, purity and brilliancy of color lighting are combined with a flexible roller caster mounting stand. Other permanent mountings are optional.

## Colortop Fuses

Trico Fuse Mfg. Co., Milwaukee, Wis., has recently begun to cadmium plate the screw shell and contact rivet of its line of "Colortop" fuses. Manufacturer claims a greatly enhanced appearance of product, as well as prevention of corrosion, better contact and the elimination of tarnish.

*Electrical Contracting, August, 1934*

## MINERALLAC



Cable or Conduit Hanger



Jiffy Clip



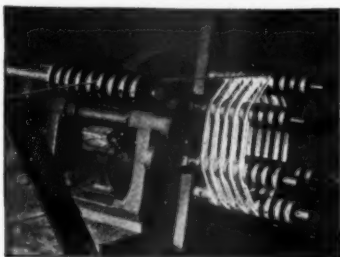
Statiscopes

Write for Literature

MINERALLAC ELECTRIC CO.  
25 No. Peoria Street, Chicago, Ill.

New York City Branch  
381 Fourth Avenue

## new... IDEAL COIL WINDER HEAD



### LOW COST - UNIVERSAL

For making most any coils (diamond or mush, loops, round, square or rectangular) for motors, armatures, fields, transformers, etc. Primarily intended for from 1 to 50 H/P motors. Maintenance or production work. Eliminates expense and delay of making special forms. Quickly reset to meet various coil shape or size requirements. Speed operation—set of 48 diamond coils made in from 30 to 45 minutes, typical. No solid side walls, permitting tape lacing of coil while still on head. Face plate fits any lathe head or other turning device. Mail the coupon today for 10 DAY FREE TRIAL or literature.

IDEAL COMMUTATOR DRESSER CO.  
1041 Park Avenue, Sycamore, Ill.

Gentlemen: Please send us

- ☐ IDEAL Coil Winder Head on 10 day trial.  
☐ Literature and low prices.

Name.....

Address.....

City.....State.....

Curtis Lighting, Inc., Chicago, Ill., has made available to the trade a portfolio covering unusual ideas for lighting large and small stores. Portfolio includes the paper recently presented before the Illuminating Engineering Society, along with photographs that show the moderne lighting used in some of the exclusive shops at Chicago's Century of Progress.

It also contains many illustrations of distinctive lighting in the United States, Canada and Europe, including the idea of concealing equipment in the tops of pedestals, cases or by the use of moderne recessed panel lighting equipment.

The Harnischfeger Corp., Milwaukee, Wis., has just issued Bulletin No. RH-1 on hoists, listing the ratings and operating ranges for type "R" hoists along with specifications and electrical accessories. The publication treats upon the application of hoists to both general and specific problems, is illustrated in color with photographs of installations and diagrams explaining simplified construction and operation, and it covers the vital points in modern hoist design.

Universal Motor Co., Oshkosh, Wis., has published a catalog covering its line of standardized power electric plants. Catalog contains illustrations and descriptive data covering all types of units manufactured by the company, and a page is devoted to specifications.

A bulletin showing the features of the Exide Keepalite Systems has just been published by The Electric Storage Battery Co., Philadelphia, Pa. The booklet gives a comprehensive presentation of the need and advantages of emergency lighting and power systems in industrial plants, hospitals, auditoriums, office buildings, etc., and contains illustrations showing the different units.

General Electric Co., Schenectady, N. Y., has issued a 10-page bulletin, GEA-1979, describing manual and magnetic starters from 25 h.p. up to 900 h.p. and for voltages to 6600. In addition to conventional types of starters, descriptive information and illustrations are given covering dust-tight enclosures, manual switch and separate starting auto-transformer

# DEALERS WANTED!

Every Range Owner in Your Town Is  
Worth Up to \$15 Quick Profit for You!

Do you want to make some money easily?  
Do you want to line up repeat business?  
Do you want to increase your weekly sales?  
You are the dealer we want. If you are willing to call on range owners, show them an item they want to buy and NEED—then you are in for some extra profits. No selling necessary. Just call on electric range users, show them the NEW Chromalox Super-Speed REPLACEMENT TOP BURNER. Let them use it and try it for a few days. Demonstration of increased cooking speed gets orders 8 out of 10 times.

Sounds too good to be true, but hundreds of dealers are making money speeding up old ranges with Chromalox. Easily installed—only screw-driver and pliers needed! No large investment involved. A few stock sizes fit all makes of electric ranges, regardless of model.

### Here's Proof



Alex Bear, Richmond, Va., electrical contractor has sold 165 Chromalox range units—made over \$360.00 profit.

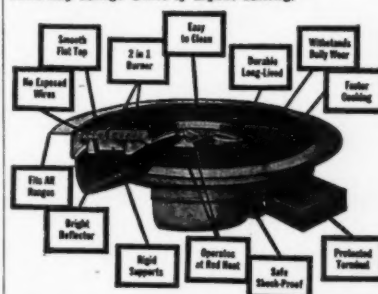


Correll Electric has practically Chromalox-equipped every range in Linton, Indiana—resold customers on electric cookery.



J. E. Heaps of Altoona, Pa. has made over \$500.00 speeding up old ranges with Chromalox. Demonstration quickly gets orders.

By TEST...Faster, More Efficient and Longer Live than any Range Units of Equal Rating!



### MAIL COUPON FOR FULL DETAILS

WITH YOUR BUSINESS LETTERHEAD TODAY!

EDWIN L. WIEGAND CO.

Manufacturers of Chromalox Heating Units  
7585 Thomas Blvd., Pittsburgh, Pa.

Without obligation, send us complete data about Chromalox Super-Speed Replacement Range Units and how we can make money selling them. There are approx. .... elec. ranges in the territory we serve. Check which ( ) We sell elec. ranges ( ) We do not sell elec. ranges. ( ) Send us catalogs about Chromalox-equipped electric ranges.

Signed..... Position.....



# August New Products

## Porcelain Fixture

The "Beam Light" line of porcelain lighting fixtures in seven Alabax glazes is announced by Pass & Seymour, Inc.,



Syracuse, N. Y. Keyless and pull cord types are available. The base of ceiling canopy is 3 1/2 in. in diameter. Glazes are supplied in white, jet black, sea green, light or apple green, ivory and orchid.

## Angle Attachment Plug

An all-rubber angle plug with prongs projecting at right angles to cord has been announced by the Merchandise Department of General Electric Co., Bridgeport, Conn. It is shallow in design since contact prongs and leads are molded in rubber. It is particularly useful for refrigerators where the normal projection of conventional plugs has interfered with setting the unit close to wall. A cord set with rubber connector molded to cord has also been developed. One piece construction and lessened cord breakage due to strain relief afforded by long-neck design of connector are features which manufacturer claims makes this an ideal extension cord for home, office or factory. Connectors may be molded on any type or length of cord. A full line of receptacles is also available for use with connector. A new rubber strain relief on high cycle (excessive flexing) cord applications, such as vacuum cleaners is also available. Small sizes for portable drills, office equipment, etc., are also available. For miniature textolite connector bodies two lips or rings are molded on the cord, one fitting into the groove provided in the connector body where cord enters.

## Sheet Aluminum Floodlight

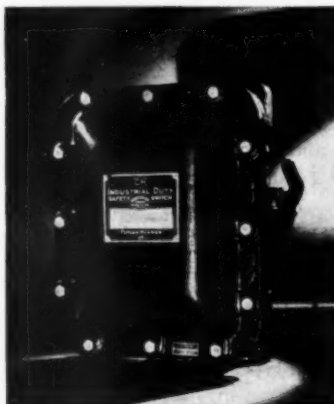
S & M Lamp Co., 36th & Broadway, Los Angeles, Calif., announces a closed type pure sheet aluminum floodlight No. 1005. It is designed for 750 to 1500 watt



clear lamps and is equipped with 16 3/4 in. heat-resisting clear lens. Unit is claimed to have highly efficient reflecting surfaces, being treated with a special "Illuminous Process". Its light weight and compactness, the manufacturer claims makes for ease of installation and adapts it to all types of outdoor applications under adverse conditions. A sheet aluminum "SM" series of reflectors, made in various types for both indoor and outdoor use are also announced. Three groups of units are made: "S" group, shade-holder type; "A" group, socket type, and "B" group, detachable reflector type.

## Explosion-Proof Switch

Cutler-Hammer, Inc., Milwaukee, Wis., announces a line of externally operated explosion-proof switches for use in Class I, Group D, hazardous locations. Both single and double throw types, in sizes up to 200 amp. are in-



cluded. Specific applications recommended for this line of switches include distilleries, dry cleaning plants, petroleum refineries, bulk oil stations, filling stations, gas plants, spray painting plants, lacquer and varnish works, etc. Switch is of heavy type A construction with weather-proof semi-steel cast enclosure, finished in black Japan. A precision machined flange is introduced between the case and cover to assure the cooling of any flame occurring from an explosion within the case so that outside gases will not ignite. Two pipe threaded conduit holes are provided in the bottom of case, also pads at the side and top of case allow for drilling other holes if needed. Provisions are made for padlocking the operating handle in "off" and "on" positions.

## Totally Enclosed Motor

A new line of d.c. motors for applications where dust, dirt, moisture or other foreign matter is present in large quantities, has been announced by General Electric Co., Schenectady, N. Y. Totally enclosed and fan-cooled, these motors are available in sizes from 1/2 to 200 h.p. Dual ventilation systems are utilized; an internal fan drawing warm air from windings and core, circulates it around



interior of motor, so that it gives up its heat to the frame and end shields. An external fan draws cool air in through mesh openings in an outer end shield and directs it over the surface of the magnet frame and inner end shields. Manufacturer claims this motor line is especially suitable for locations where obnoxious process-dusts prevail, and to such apparatus as stokers, conveyors, pumps, machine tools, sand screens and shakers. They are suitable also for outdoor use in mild climates. Greater output per pound of material, saving in space, economy of operation, as compared with totally enclosed non-fan-cooled motors, are further claims.

## Solderless Connector

The "Handi-lug" line of solderless connectors is announced by Trumbull Electric Mfg. Co., Plainville, Conn. These connectors are adjustable for taking a range of wire sizes. Eight con-



nectors are available to accommodate wire from No. 14 up to 1,000,000 c.m. Definite mechanical and electrical connections plus a saving in labor are claimed for this line. The manufacturer announces that solderless lugs may now be furnished on their distribution equipment.

## Pyranol Treated Cable

A Pyranol-treated paper-insulated cable limited to 600 volts, and adapted to low-voltage network cables, has been developed by General Electric Co., Schenectady, N. Y. The inflammable gases given off on cable failures by burning organic insulation tend to damage the duct and manhole structures and may also injure nearby cables. The manufacturer claims this new Pyranol treatment tends to snuff out any combustion or smoldering in the paper insulation. Higher-voltage cables are now under development.

Electrical Contracting, August, 1934

## EXPANSION CONDUIT AND PIPE HOOKS

Saves you real money on every job that requires fastening conduit to masonry and concrete.

A complete fastening unit—no other fittings required—Sizes  $\frac{1}{2}$ " to  $1\frac{1}{2}$ ". For a strong permanent economical fastening, insist on

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128 S. Clinton St.,  
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"BULL DOG" INSULATOR SUPPORTS  
"KEYSTONE" FISHWIRE  
CONDUIT BENDERS

All manufactured by Fullman Mfg. Co. and carried in stock by over 300 jobbers—Send for Catalog No. 225.  
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"Standardize on  
STANDARD  
Transformers"

ALL TYPES  
Indoor and  
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Service

Send for  
Descriptive  
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**STANDARD TRANSFORMER CO.**  
Warren ..... Ohio

## Keep Up-to-Date

By reading these pages you will acquaint yourself with what is newest and best in electrical supplies and equipment. When communicating with an advertiser mention

**Electrical Contracting**

unit, and Telechron-motor-operated transfer relay for magnetic reduced-voltage starters.

A section devoting liberal space to describing auto-transformers appears in this bulletin, as well as a condensed summary of types covered, dimensions and shipping weights.

Multi Electrical Manufacturing Co., 1840 West 14th St., Chicago, Ill., has just published Catalog No. 12 covering Multi electrical wiring devices, copper solder lugs and fuse clips, and Catalog No. 13 covering general lighting equipment, commercial lighting fixtures, reflectors, floodlights and accessories. Both catalogs contain illustrations of units, descriptive data and price-lists.

The Wolverine Tube Company, Detroit, Mich., announces the appointment of S. R. Fralick & Company, 564 West Monroe St., Chicago, representative for northern Illinois, eastern Iowa and southern Wisconsin on Wolverine lugs and sleeves. Heretofore the line has been handled by Steel Sales Corporation of Chicago, the Wolverine representatives on seamless tubing and tubing products.

South Bend Lathe Works, South Bend, Ind., has just published its Catalog No. 94, which is a 72-page general catalog showing its complete line of lathes and attachments for repair shops, equipment and instrument maintenance shops, experimental laboratories and general machine shops. The catalog illustrates, describes and prices 96 sizes and types of lathes, all of the back-gear, screw cutting type, and lathes range from small bench lathes up through the medium sizes to large swing lathes, including gap bed lathes.

United States Electric Mfg. Corporation, New York City, has just released its catalog covering UsaLite products. This is a loose-leaf catalog, containing descriptive information and illustrations of all the units manufactured by the company, together with price-lists.

"Magnet Wire and Coils" is the title of General Electric Company's new folder GEA-1953. The inside pages illustrate a variety of magnet wire and coil assemblies, with brief descriptive comments.

## Would you like a Set of These DATA SHEETS



Covering Remote Control for  
Lighting Circuits

Prepared by Don Graf

They are free. Just send the coupon. These data sheets were prepared for Architects, but are invaluable for every electrical contractor.

They tell you How, When and Where to use Remote Control Switches, with wiring plans.



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THE HART MFG. CO., Hartford, Conn.

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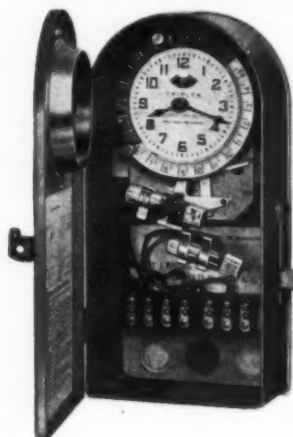
No Solder!



Installed  
in a minute  
with only a wrench

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ENGINEERING CO., INC.  
305 EAST 45TH STREET, NEW YORK  
*Agents Everywhere*

## CONTRACTOR'S DISCOUNT ON MERCOID-TRIPLEX TIME SWITCHES ASSURE YOU A HIGH PROFIT RATE



### Sell Your Customer on the High Quality of the MERCROID-TRIPLEX TIME SWITCH

Note the following outstanding features:—

1. The well known and time tested Waltham clock movement and self-starting synchronous motor assure accurate electric time as well as dependable switching control.
2. Accurate electric time at a glance on silver finished dial with bronze numerals. Rotating seconds disc indicates clock is running.
3. As quickly and easily set on time as your watch. Ratchet prevents turning backwards.
4. 24 hour rotating rim on which "ON" and "OFF" clamps are easily set (independent of the time setting) to control predetermined switching.
5. Mercury enclosed contact switches operated by positive snap-action mechanism. Mercoid switches are not affected by dust, dirt or corrosion.

Write for bulletin 115-T describing in detail the above and many other important features.

Mercoid Controls Are Distributed and Stocked in  
Many Cities By The Graybar Electric Co., Inc.

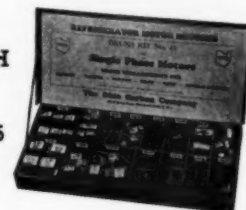
**THE MERCROID CORPORATION**  
Sole Manufacturers of The Mercoid Switch  
4223 Belmont Avenue, Chicago, Illinois

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## Announcing A REFRIGERATOR MOTOR BRUSH KIT

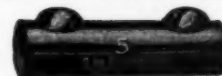
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A STANDARD TYPE  
WITH IMPROVED  
FEATURES!

These connectors are made of  
solid brass rod. All dimensions  
and proportions are carefully held  
to accurate size.

All screws heavily rust-proofed  
preventing rusting in stock and  
making it convenient to use con-  
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The old standby type that now  
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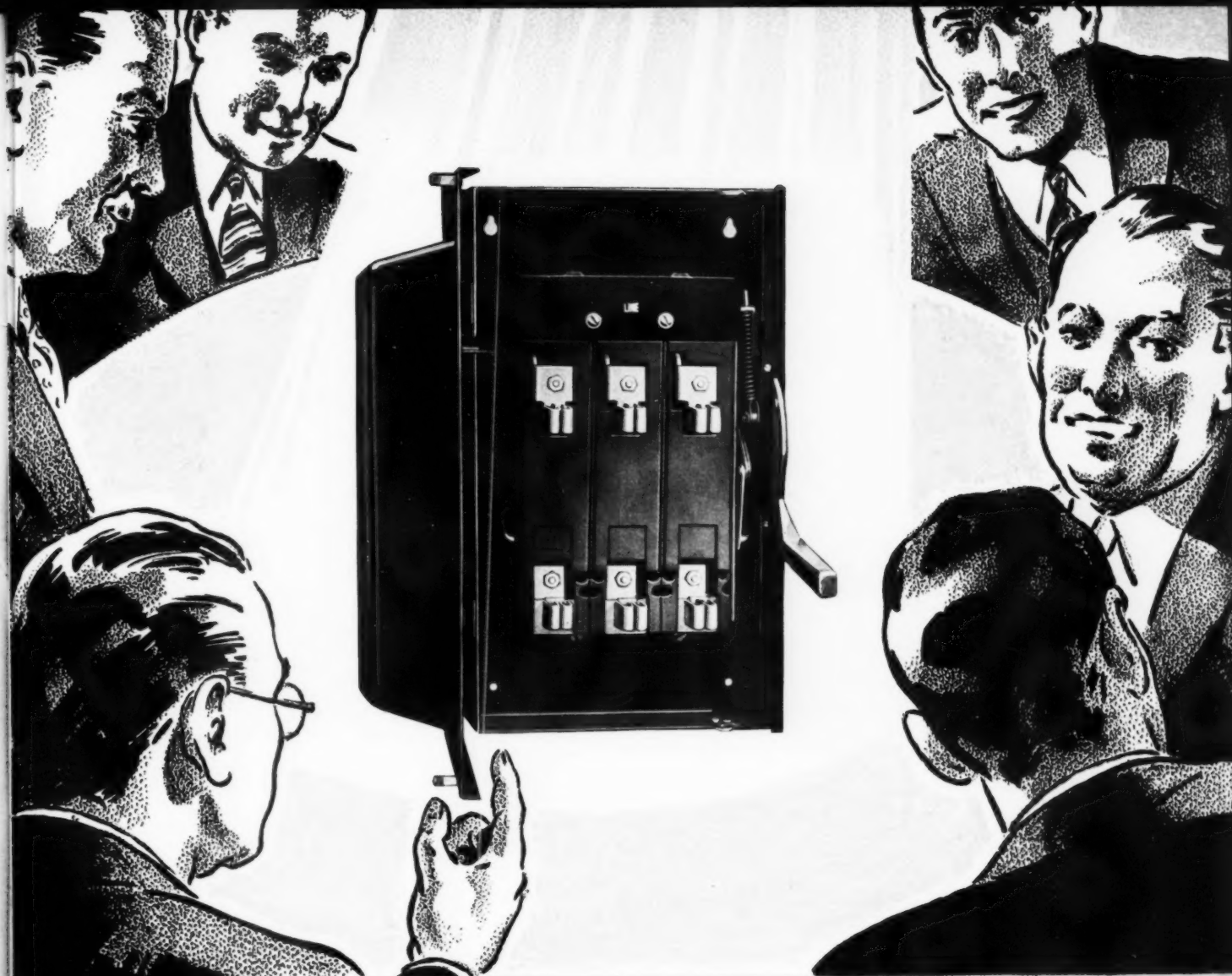
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BATTLE CREEK, MICHIGAN





## A New Industrial Safety Switch

The 100 ampere and 200 ampere sizes of the "50,000 Series" Square D industrial safety switches are now on the market.

Look at these special features—front operation—drop forged handle—quick make and quick break—double break contacts—Square D positive pressure fuse clips—a very compact switch with ample room

for easy wiring. These larger switches are built with a unit construction. The entire switch mechanism is removable from the cabinet.

Don't fail to see these new switches. You'll find their attractive appearance as far ahead of the field as their outstanding mechanical developments.



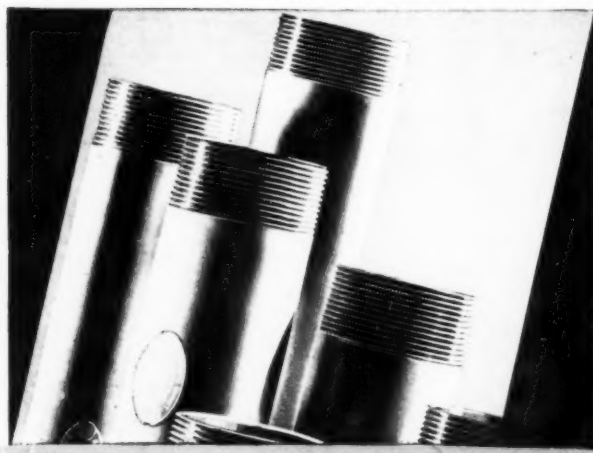
# SQUARE D COMPANY

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**RESISTS CORROSION  
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Saves time, labor.**



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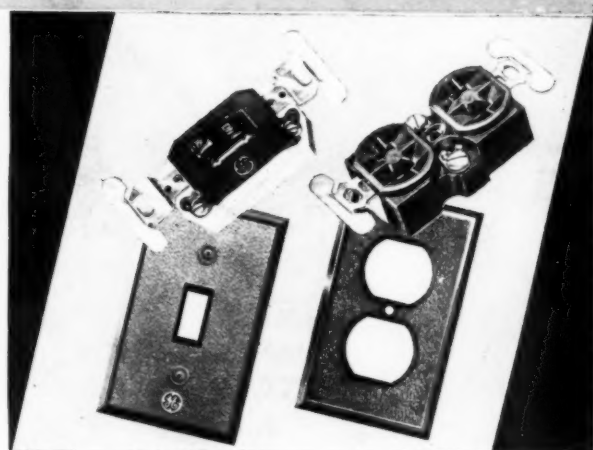
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